South African Medical Journal

Organ of the Medical Association of South Africa

S.-A. Tydskrif vir Geneeskunde

Vakblad van die Mediese Vereniging van Suid-Afrika

incorporating the *South African Medical Record* and the *Medical Journal of South Africa*

REGISTERED AT THE GENERAL POST OFFICE AS A NEWSPAPER

Vol. 27, No. 9 | Cape Town, 28 February 1953 | Weekly 2s 6d

IN THIS ISSUE

Editorial : Van die Redaksie

BCG Vaccination Against Tuberculosis

BCG-Inenting Teen Tuberkulose

Original Articles

The Ever-Continuing Search for Immunity in Tuberculosis

Traumatic Perforation of the Oesophagus

Lumbar Intervertebral Disc Herniation

Appendicectomy

In Passing | *In Memoriam*

New Preparations and Appliances | *Correspondence*

Support Your Own Agency Department (Pp. xxxiv, xxxv)

Ondersteun u Eie Agentskap-Afdeling (Bls. xxxiv, xxxv)

Professional Appointments (Pp. xxxv-xxxviii)

South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde
P.O. Box 643, Cape Town Posbus 643, Kaapstad

Vol. 27, No. 9 Cape Town, 28 February 1953 Weekly 2s 6d

CONTENTS

The Ever-Continuing Search for Immunity in Tuberculosis. *Dr. J. A. Myers* ... 169
Editorial: *BCG Vaccination Against Tuberculosis* ... 172
Van die Redaksie: *BCG-Inenting teen Tuberkulose* ... 172
Traumatic Perforation of the Oesophagus: A Review Illustrated by 18 cases. *Mr. D. Alder, F.R.C.S., Edin. and Mr. D. Fuller, F.R.C.S., Eng.* ... 173
Lumbar Intervertebral Disc Herniation: A Method of Conservative Treatment. *Dr. C. W. Coplans* ... 182
Appendicectomy: A Survey of 200 Cases. *Dr. W. Silber* ... 187
New Preparations and Appliances: *Pentresamide and Pentresamide 250; Penalev; Veriloid in Hypertension* ... 190
In Memoriam: *Mr. M. H. Wostenholm, F.R.C.S.* ... 191
In Passing ... 191
Correspondence: Registration of Specialities: Amended Rules (*Mr. W. H. Barnard*); The Sick African: Second Edition (*Mr. J. Douglas Duncan*); Railway Sick Fund: Remuneration for Anaesthetics (*Dr. F. W. Roberts*) ... 191

South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde

P.O. Box 643, Cape Town — Posbus 643, Kaapstad

Vol. 27, No. 9 — Cape Town, 28 February 1953 — Weekly 2s 6d

THE EVER-CONTINUING SEARCH FOR IMMUNITY IN TUBERCULOSIS

[*The following Summary is taken from a review entitled* The Ever-Continuing Search for Immunity in Tuberculosis *by Dr. J. Arthur Myers, originally published in Post-graduate Medicine, Vol. 12, Nos. 2, 3 and 5 (August, September and November) 1952.*—Editor]

1. Promptly after announcement of the discovery of the tubercle bacillus, the thought of producing an artificial immunizing agent pervaded the minds of many physicians and scientists. Almost immediately, Koch and others instituted experiments designed to discover such an agent.

2. Attempts were made to weaken or reduce virulence of tubercle bacilli on the theory that they would then be tolerated by animals while immunity was being developed. It was hoped that sufficient immunity would thus be established to protect against subsequent invasions of virulent tubercle bacilli. At first the method appeared encouraging, as animals infected with tubercle bacilli of reduced virulence later appeared to be protected against injections of virulent organisms. Such animals seemed healthy when the controls were falling ill and dying. A little later, however, the vaccinated animals also fell ill and died from tuberculosis. Thus they had not been protected against ultimate illness and death. The opinion was then expressed that tuberculosis differs from such diseases as smallpox, typhoid fever and diphtheria in that an infection does not result in dependable immunity.

3. Marfan established a law (1886) to the effect that persons who had recovered from tuberculosis or had evidence of healed tuberculous lesions of the skin and lymph nodes would not subsequently develop pulmonary tuberculosis. He had not observed his subjects sufficiently long. Prolonged observation has since revealed that such persons develop clinical tuberculosis of the lungs and other parts of the body with considerable frequency.

4. In 1890 Koch announced that he had produced a substance (now known as tuberculin) which not only prevented tuberculosis in animals but also cured those which had extensive disease. Since that startling announcement no one has ever made an animal or a person more resistant than normal to tubercle bacilli by administration of tuberculin.

5. Experiments reported in 1891 resulted in what became known as Koch's phenomenon. This only demonstrated that first infection with tubercle bacilli results in hypersensitivity to tuberculoprotein so that a reinfection brings forth a more intense and specific response of the tissues with resulting necrosis. When this necrotic tissue sloughed from the skin of animals the lesions appeared to heal. Thus Koch believed this apparent healing process was the result of resistance established by the first infection. The apparent healing of these superficial lesions was deceptive, since all such guinea pigs later died from tuberculosis.

6. Some workers who were opposed to the use of living tubercle bacilli as vaccine made preparations from dead organisms. Different methods were used to kill them, such as heat, chemical reagents and ultraviolet light. At first some of these preparations also seemed to offer considerable promise, since animals which received them later appeared to resist injections of virulent tubercle bacilli definitely better than did controls. However, all the vaccinated animals later fell ill and died from tuberculosis. Therefore, this method was equal to but no better than the use of living tubercle bacilli of reduced virulence. In the United States, von Ruck and his followers made sweeping claims for such a vaccine. He made a strenuous effort to have it licensed by the United States Public Health Service, but failed.

7. Numerous further attempts were made by a large number of workers early in the twentieth century to produce an effective vaccine from living tubercle bacilli of reduced virulence. Among the many vaccines that were produced, the one by Von Behring was most extensively used. Over a period of six and one-half years he had markedly reduced virulence of a culture of human type tubercle bacilli which became known as bovovaccine. This was intended to immunize cattle and he planned to make a vaccine from bovine type bacilli for the immunization of humans. With reference to efficacy, he likened bovovaccine to Jenner's vaccine for smallpox. Through immunization he believed that tuberculosis would soon be a disease of only historic interest. The German government constructed an institute where this vaccine was made for distribution throughout the world. It became obligatory in a number of German provinces. Von Behring had drawn conclusions without sufficiently long periods of observation. His vaccine was later proved to be of no more value than the many others made from dead or living tubercle bacilli which had preceded it. A great deal of pressure was exerted to have Von Behring's vaccine widely used in the United States. Veterinarians gave it a thorough trial but found it wanting.

8. Friedmann made a live tubercle bacillus vaccine from organisms isolated from a water turtle. He claimed this to be of great value in preventing tuberculosis and also in curing those who already had clinical disease. He

came to the United States, where this widely announced preparation was in such demand that an institute was set up for him in New York City from which his vaccine was to be dispensed throughout the country by state sub-institutes. Careful investigation revealed that Friedmann's claims were not justified, whereupon the New York Department of Health prohibited its further distribution.

9. Living virulent human type tubercle bacilli in extremely small doses were employed by Webb and co-workers about 1909 to immunize animals and children. They started by introducing a single tubercle bacillus and gradually increased the number on subsequent injections. Calmette had these experiments repeated on animals and came to the conclusion that it was an exceedingly dangerous procedure and strongly condemned it.

10. Calmette and Guérin markedly reduced the virulence of a highly virulent bovine type of tubercle bacillus which had been isolated by Nocard in 1902. When introduced into animals they thought this vaccine produced a high degree of resistance or immunity to virulent tubercle bacilli later administered. However, their animals were not kept under observation sufficiently long. They were so convinced of its efficacy that in 1921 they gave it their names, *Bacillus Calmette-Guérin*, since known as BCG. In 1924 Calmette declared BCG a *virus fixé*.

11. BCG was first administered to infants by Weill-Halle and Turpin in 1922. These infants were then isolated from contagious cases of tuberculosis, but the results were compared with unvaccinated children who had remained in environments contaminated with tubercle bacilli. More clinical tuberculosis developed among the unvaccinated and it was concluded that BCG was responsible for protecting the others. Calmette refused numerous demands of clinicians and scientists to conduct a well controlled study because he believed the efficacy of BCG already had been proved. Over the next few years Calmette's reports were severely criticized. Petroff studied BCG cultures in the laboratory and found that certain colonies produced progressive tuberculosis in guinea pigs. This was followed by the Lübeck disaster.

12. Veterinarians of Canada and the United States put BCG to a most rigid test in cattle. They found that vaccinated animals developed as much tuberculosis as did controls when later subjected to the same exposure to animals with contagious disease. They then discarded BCG and abandoned the hope of its being of value in their tuberculosis eradiction program.

13. During the first quarter of this century numerous workers in various parts of the world expressed a view almost identical to that of European physicians in the late 1880's, to the effect that an attack of tuberculosis does not confer dependable immunity, and therefore it is futile to attempt to produce immunity artificially.

14. For some years enthusiasm for the use of BCG or any other artificial immunizing substance was at low ebb. In a few places, however, the subject was kept alive and BCG was administered to uninfected children and later to young adults. Some reports were favourable and others were discouraging. In recent years considerable enthusiasm for the use of BCG has been expressed. A few workers have reported that from 60 to 80 per cent. of tuberculosis among people can be prevented by BCG. However, no study has been well controlled and so many other factors are involved that there is no actual proof for such conclusions. Moreover, on analysis one finds that these figures are based on allergic manifestations such as erythema nodosum, enlargement of hilum structures, pleurisy and an occasional case of meningitis or military tuberculosis, which occur about the time the tissues become allergic to tuberculoprotein. Such conditions constitute only about 3% of the tuberculosis problem. Therefore, if it were definitely proved that BCG would prevent 60 to 80% of these allergic manifestations, it would apply to only about 3% of the problem with no consideration of the remaining 97%.

15. There is no evidence that BCG administered to children or young adults has any influence on clinical tuberculosis which develops two or three years or more after the initial infection. Yet approximately 97% of the tuberculosis problem lies here.

16. The safety of so-called BCG now in use has been seriously questioned. Cultures of BCG now dispensed from various laboratories of the world have been found to vary tremendously in virulence and other characteristics. Even in individual cultures, instead of one bacterial form such as Calmette produced being present, several bacterial forms have been found. These also vary markedly in characteristics such as their ability to multiply in animal tissues. At this moment no one knows just what the BCG cultures in use to-day actually contain.

17. BCG has recently been found to produce progressive and sometimes fatal disease in mice on deficient diets, silicotic guinea pigs and normal golden hamsters.

18. Apparently BCG does not have the fleeting existence in the animal body that was previously supposed. The bacilli have been found alive and able to produce progressive disease in silicotic guinea pigs for as long as 18 months. How much longer they may live in animal tissues no one knows, nor it it known how long they survive in human tissues. In animals, when administered subcutaneously, the bacilli have been found in lymph nodes 18 cm. distant within three minutes. Approximately half have reached such nodes within 10 minutes. They have been found in the spleen within 11 days after administration. Therefore the idea that the organisms remain at the site of administration and in the regional lymph nodes must be revised. Evidence now available suggests that they are deposited in internal organs rather promptly.

19. When introduced subcutaneously and sometimes intracutaneously, abscesses and ulcers appear at the site of administration, and regional lymph nodes enlarge, rupture and discharge pus for months. This is clinical tuberculosis.

20. Subsequent to receiving BCG, a good many persons have developed clinical tuberculosis and a considerable number have died. There is a sparsity of biopsy materials and postmortem studies to determine the type of tubercle bacilli responsible.

21. So-called BCG of to-day does not meet Calmette's requirements. He stoutly maintained that no living tubercle bacillus capable of producing tubercles in animal and human tissues should be employed as vaccine. He said the bacillus which he and Guérin named BCG would not produce tubercles. The material now called BCG produces lesions at the site of administration and also in the regional lymph nodes—lesions which sometimes present all the characteristics of clinical tuberculosis pro-

duced by virulent tubercle bacilli. Calmette also said that BCG was a *virus fixé*. Cultures called BCG to-day contain organisms that vary tremendously in virulence; indeed, so much so that they must be watched with extreme care to prevent the development of a large number of cases of clinical tuberculosis at the sites of administration and in regional nodes. There is no reason to suspect that they do not produce such lesions elsewhere in the body after passing regional nodes. The standards which Calmette laid down would not permit the use of the present day so-called BCG which has been found to result in progressive and sometimes killing disease in certain laboratory animals.

22. When the Research Foundation and the University of Illinois were licensed in 1950 for manufacture, exportation, importation and sale of BCG, there was no incontrovertible evidence that it produces dependable immunity or that it is safe to introduce into human bodies.

23. After 45 years of trial in animals and 30 years of administration to humans, the use of BCG remains an experiment and is one of the most controversial subjects in the history of medicine.

24. The more recently isolated vole tubercle bacillus (1937), when introduced as a living 'vaccine' results in the same phenomenon as a large number of other preparations previously employed, including BCG. It allergizes tissues of animals, thus giving them a temporary fixing power for virulent tubercle bacilli later administered, but it does not prevent ultimate illness and death from tuberculosis.

25. As evidence accrued concerning the danger of introducing into humans living tubercle bacilli thought to be attenuated in virulence, many workers—recognizing the probable danger ahead—have recently advocated the use of only dead tubercle bacilli as vaccine. Thus preparations have been made from virulent human type and vole tubercle bacilli killed by ultraviolet light, as well as from dead BCG. These make the tissues of animals allergic to tuberculoprotein to approximately the same degree as live BCG. This is a revival of methods used in the latter part of the nineteenth and the early part of the twentieth century, with the same result. It is deceiving workers of to-day just as it did those of earlier periods. Although vaccine made from dead tubercle bacilli avoids the danger of causing progressive tuberculosis, there is no proof that it provides dependable immunity.

26. Paradoxically, allergy is now used as a criterion of presence of immunity. When an animal or a person has received a so-called vaccine made from either living or dead tubercle bacilli and allergy is demonstrated by the tuberculin reaction, immunity is said to have been established. As yet, no satisfactory evidence has been presented to show that allergy has anything to do with immunity. The tuberculin reaction now being used as a criterion for the presence of immunity is only a test for hypersensitivity of tissues to tuberculoprotein.

27. Allergy is usually a prerequisite to the development of clinical tuberculosis; therefore to produce allergy artificially is to set the stage for this type of disease if and when virulent tubercle bacilli invade the tissues.

28. Accomplishments by standard methods are now being credited to so-called immunizing agents. In areas including nations where BCG has been extensively used, mortality rates have not decreased more than in other places where no so-called immunizing agent has been employed. If an immunizing agent were effective, it should first be reflected in reduced morbidity, but in areas where BCG has been extensively used there is no evidence of corresponding reduction in morbidity that is not explainable as resulting from other factors. The most marked decreases in tuberculosis mortality have occurred in areas and nations where BCG has not been used. In such places there is every reason to believe that the reduction in tuberculosis has been due to education resulting in early case-finding, isolation and treatment in hospitals and sanatoriums, and control of tuberculosis in animals.

29. The present propaganda for so-called immunizing agents presents a serious threat to the most successful tuberculosis control program of all time. Persons found to have contagious tuberculosis and some now instutionalized for this disease are asking that they be permitted to remain in or return to their homes because they have 'learned' that their children and other associates can be vaccinated against tuberculosis as is done against smallpox. Legislators are asking why funds should be requested for the building of new sanatoriums and additions to and repairs to others, since they have been given the impression that sanatoriums will not long be necessary because of vaccination. People are asking why there should be a tuberculosis Christmas Seal sale, since they believe vaccination will soon make such organizations as the National Tuberculosis Association and its 3,000 component societies unnecessary.

30. The tuberculin test is the finest of all diagnostic, epidemiologic and control-measuring agents. Administration of BCG, vole tubercle bacilli or dead organisms nullifies the subsequent use of the tuberculin test to determine whether and when virulent forms of tubercle bacilli enter the body. Thus the individual is denied the inalienable right to know if and when this significant event occurs. If a drug is found that will destroy tubercle bacilli in human tissues, it will be most effective when administered promptly after first invasion with virulent tubercle bacilli. The early presence of such invasion can be determined only by the tuberculin test. Such prompt detection and efficacious treatment will be denied those who have previously had BCG.

31. No present day so-called immunizing agent can be used as an adjunct to the fundamental tuberculosis eradication program. These agents not only destroy the value of the tuberculin test but also give the public a false sense of security.

32. Although so much is now being said about efficacy and harmlessness of so-called immunizing agents that those who have become overzealous about them are risking great names, it appears that the majority of physicians have not lost their poise. Their fundamental training and experience do not permit speculations, theories and personal opinions in matters so important as the eradication of man's greatest scourge. On the other hand, the same training and experience cause them to approve and enthusiastically support methods and procedures with thoroughly proved safety and efficacy such as immunization for smallpox and typhoid fever, insulin for diabetes and roentgen ray in diagnosis.

South African Medical Journal
Suid-Afrikaanse Tydskrif vir Geneeskunde

EDITORIAL

BCG VACCINATION AGAINST TUBERCULOSIS

We drew attention recently[1] to the considerable controversy which exists about the value of BCG vaccine as a protection against tuberculous infection in man, and we pointed out that enthusiasm may well have outrun discretion and commonsense in this field of alleged prophylaxis.

There is no doubt that the medical profession is not unanimous about the value of BCG vaccine in the same way in which the profession is unanimous about vaccination against smallpox, or inoculation against typhoid fever, or the prevention of diphtheria. Indeed, Prof. M. S. Marshall,[2] Professor of Microbiology at the School of Medicine, University of California, took the view that such conclusions as can be drawn from extant data are actually against the use of BCG, and not in its favour. Professor Marshall is inclined to the opinion that in the light of existing data gathered over several decades even a pilot experiment is not justified. This may be regarded as rather extreme a position to adopt, but serious consideration should be given to his view that scientific enthusiasts should not fall back 'on impregnable omniscience' to further their propaganda.

Some students of the problem have seriously put forward the view that the already adequate data available permit only equivocal conclusions to be drawn, and that there is no unequivocal answer which awaits the honest inquirer.

Elliott *et al.*[3] took the contrary view that there is need for 'great consideration before we decide to abandon the use of BCG and await the results of a 25-year experiment, especially when we consider how slowly social conditions must of necessity advance among the 11,000,000 Bantu of this country. . . . The *Journal* should not run the risk of putting itself in the position of pre-judging matters which are the concern of the Government Health Authorities, who no doubt seek advice before arriving at their decisions'.

The Government Health authorities have not, of course, pre-empted the right to be concerned about the immunological problems associated with tuberculosis, and we cannot agree that it is desirable to submit to such an authoritarian attitude. All the evidence must be weighed dispassionately and scientifically before a policy of action is undertaken.

1. Editorial (1952): S. Afr. Med. J., **26**, 162.
2. Marshall, Max S. (1952): S. Afr. Med. J., **26**, 678.
3. Elliott, G. A. *et al.* (1952): S. Afr. Med. J., **26**, 321.

VAN DIE REDAKSIE

BCG-INENTING TEEN TUBERKULOSE

Ons het onlangs[1] die aandag gevestig op die aansienlike meningsverskil oor die waarde van BCG-entstof as beskerming teen tuberkulose-besmetting by die mens en daarop gewys dat dit wel mag wees dat oordeelkunde en gesonde verstand op hierdie gebied van beweerde voorbehoeding deur geesdrif oorskry word.

Daar bestaan geen twyfel nie dat die mediese professie nie tot dieselfde mate oor die waarde van BCG-entstof ooreenstem nie soos wel in die geval van enting teen pokkies, of inenting teen maagkoors, of die voorkoming van witseerkeel. Inderdaad het Prof. M. S. Marshall,[2] Professor in Mikrobiologie by die Mediese Skool van die Universiteit van Kalifornië, die sienswyse gehuldig dat die gevolgtrekkings waartoe geraak kan word op die bestaande gegewens in werklikheid teen die gebruik van BCG en nie in die guns daarvan is nie. Professor Marshall is geneig tot die mening dat, in die lig van bestaande gegewens wat oor verskeie dekades ingewin is, selfs 'n proef-eksperiment nie geregverdig is nie. Dit mag beskou word as 'n ietwat uiterste standpunt om in te neem, maar ernstige oorweging moet gegee word aan sy mening dat wetenskaplike geesdriftiges nie moet terugval ‚op onaantasbare alwetendheid' om hulle propaganda te bevorder nie.

Sommige studente van die probleem het in alle erns die mening uitgespreek dat die alreeds voldoende gegewens beskikbaar slegs twyfelagtige gevolgtrekkings moontlik maak, en dat daar geen ondubbelsinnige antwoord is wat op die eerlike navorser wag nie. Elliott *et al.*[3] het die teenoorgestelde mening uitgespreek dat daar noodsaaklikheid bestaan vir ‚deeglike oorweging voor ons besluit om die gebruik van BCG te laat vaar en die resultate van 'n 25-jaar lange eksperiment afwag, veral as ons in aanmerking neem hoe stadig maatskaplike toestande noodgedwonge onder die 11,000,000 Bantoes van hierdie land vorder . . . Die *Tydskrif* moet nie die gevaar trotseer om homself in die posisie te plaas om sake vooraf te veroordeel nie wat by die Gesondheidsowerhede van die Staat tuishoort, wat ongetwyfeld advies inwin voordat hul 'n besluit neem'.

Die Gesondheidsowerhede van die Staat het natuurlik nie 'n opsie op die reg om besorgd te wees oor die immunologiese probleme wat aan tuberkulose eie is nie, en ons kan nie saamstem dat dit wenslik is om ons aan so 'n outoritêre houding te onderwerp nie. Al die getuienis moet besadig en wetenskaplik oorweeg word voordat daar op 'n beleid van optrede besluit word.

1. Inleidingsartikel (1952): S.A. Tydskrif vir Geneeskunde, **26**, 162.
2. Marshall, Max S. (1952): S.A. Tydskrif vir Geneeskunde, **26**, 678.
3. Elliott, G. A. *et al.* (1952): S.A. Tydskrif vir Geneeskunde, **26**, 321.

In such a context of considerations it becomes important to scrutinize with the greatest care and caution programmes relying upon BCG vaccine for the eradication of tuberculosis.

One of the most comprehensive, thoroughly documented, dispassionate and well-balanced reviews of the subject has recently been published by an eminent student of the problem, Dr. J. Arthur Myers.[4] All practitioners should pay attention to this excellent contribution, which does much to inject basic principles and scientific discipline as well as commonsense into the highly emotional debates which are aroused from time to time by the protagonists of BCG vaccine. Elsewhere in this issue we reproduce *in extenso* the summary of Dr. Myers' paper, because it may well be regarded as the definitive survey of the problem at the present time.

4. Myers, J. A. (1952): Postgrad. Med., **12**, 2, 3 and 5 (August, September and November).

In so 'n samehang van oorwegings word dit noodsaaklik om programme, wat op BCG-entstof staatmaak vir die uitwissing van tuberkulose, met die grootste sorg en versigtigheid noukeurig te ondersoek.

Een van die mees omvattende, deeglik gedokumenteerde, besadigde en goed gebalanseerde beskouings van die onderwerp is onlangs deur 'n uitmuntende student van die probleem, dr. J. Arthur Myers[4] gepubliseer. Alle geneeshere behoort aandag te skenk aan hierdie uitstekende bydrae, wat veel doen om basiese beginsels en wetenskaplike dissipline, sowel as gesonde verstand tot die hoogs-emosionele debatte by te dra wat van tyd tot tyd deur die kampvegters van BCG-entstof aangepor word. Elders in hierdie uitgawe word die opsomming van dr. Myers se verhandeling uitvoerig weergegee, want dit mag wel as die duidelik omskrewe oorsig van die probleem op die huidige tydstip beskou word.

4. Myers, J. A. (1952): Postgrad. Med., **12**, 2, 3 en 5 (Augustus, September en November).

TRAUMATIC PERFORATION OF THE OESOPHAGUS

A REVIEW ILLUSTRATED BY 18 CASES *

DAVID ADLER, M.B., CH.B. (U.C.T.), F.R.C.S. (EDIN.)

and

DENIS FULLER, F.R.C.S., ENG.

Johannesburg

The relative frequency of traumatic perforations of the oesophagus in this country, the seriousness of the condition, the paucity of cases described in the South African medical literature and the divergence of opinions expressed therein call for a review and a description of 18 personal cases seen in Johannesburg since July 1947. Knox,[1] in describing a case of post-cricoid perforation of the oesophagus, concludes: 'as soon as the diagnosis is made the perforation should be exposed and sutured.' On the other hand, Phillips[2] states: 'for tears of the oesophagus it was best to treat conservatively by chemotherapy and antibiotics and reserve operation for the removal of foreign bodies.'

With this latter view Seybold *et al.*,[3] disagree and state: 'Our experience supports the widely accepted principle that early surgical drainage is indicated in the treatment of perforation of the oesophagus and it is in agreement with the idea that while penicillin is inadequate when used alone, its use has resulted in a significant improvement in the survival rates following surgical drainage.' As their review covers 50 cases over 42 years from 1907 to 1949 it should be respected. Korkis[4] pleads for an early combined attack and states: 'Chemotherapy and antibiotics are the hand-maidens of surgery in dealing with suppurative mediastinitis.'

Slesser,[5] reports 6 cases and advocates immediate surgery in thoracic perforations. In cervical perforations she suggests that there is some place for conservative treatment which should not be persisted in unless response is sustained.

Weise and Raine,[5] reporting 7 traumatic perforations, also advocate immediate surgery supplemented by drainage, anti-microbic drugs and supportive therapy.

CLASSIFICATION

Oesophageal perforations may be classified as:

1. *Spontaneous.* Here the oesophagus has previously been normal, the tear is longitudinal at the lower end and follows severe strain such as violent vomiting after excessive eating. One such case has been operated upon at the General Hospital by colleagues, with a fatal outcome, and is not included in this paper.

2. *Traumatic.* (a) *Instrumentation.* Most cases are due to perforation by an oesophagoscope either during diagnostic oesophagoscopy, or for dilatation for established caustic stricture or for removal of foreign bodies; others are due to the Plummer-Vinson bag for dilatation of cardio-spasm, introduction of Souttar's tubes for carcinoma or by the gastroscope.

(b) *Foreign Bodies.* Perforation may be due to penetration by an intra-oesophageal foreign body or by damage to the oesophagus during removal of foreign bodies.

3. *Inflammatory.* This can occur in acute specific fevers, non-specific oesophagitis, tuberculosis and syphilis. We have seen one case of post-traumatic perforation following careful instrumentation in a non-specific oesophagitis probably due to oesophagitis in an hiatus hernia.

4. *Caustic Perforations.* Although we have seen only one case with perforation in the subacute phase, many more such cases must be seen at autopsy.

5. *Peptic Ulceration.* Although perforation with secondary peri-oesophageal abscess is possible, we have encountered no such case.

* A paper read at the South African Medical Congress, Johannesburg, September 1952.

6. *Curling's Ulcer.* Finch and Swanson,[7] reviewing the literature, found they had 3 deaths following craniotomy in the vicinity of the hypothalamus. These patients developed an acute perforation of the oesophagus at its lower end with suppurative mediastinitis and empyaema. Cushing had previously recorded 3 cases of spontaneous perforation of the oesophagus following operations on the cerebellum.

The aetiology of the 18 cases referred to us has been as follows:

Diagnostic oesophagoscopy: 2 (Cases 8 and 15).
Oesophagoscopy and dilatation: 4 (Cases 2, 4, 6, 10).
Oesophagoscopy and removal of foreign body: 4 (Cases 1, 3, 11, 13).
Foreign body perforation (no oesophagoscopy): 6 (Cases 5, 9, 12, 14, 16, 18).
External violence in the presence of a stricture: 1 (Case 7).
Sub-acute perforation (caustic soda): 1 (Case 17).

Site of Perforation

Perforation is most common at the site of anatomical narrowing of the oesophagus, viz. post-cricoid, arch of aorta and immediately above the diaphragm. Post-cricoid perforation following instrumentation is due to the fact that pressure from a rigid oesophagoscope may cause necrosis of the posterior wall of the oesophagus, where it is compressed against the anterior surfaces of the bodies of the 6th and 7th cervical vertebrae. In elderly patients, where the mobility of the neck is diminished and where osteo-arthritic outgrowths are present in this region, perforations are all the more likely to occur. Another cause for the injury at this site is rough instrumentation to overcome spasm of the crico-pharyngeus muscle. It is because of this muscle spasm that we prefer to have deep general anaesthesia for oesophagoscopy.

The sites in present series were:
Post-cricoid: 8.
Arch of aorta: 5.
Above the diaphragm: 5.

Age

The youngest patient was a little girl of 2 years 8 months, the oldest a woman of 72.

Age incidence in decades

0 – 10 Two cases (17, 18).
11 – 20 One case (10).
21 – 30 Two cases (2, 7).
31 – 40 Four cases (1, 3, 6, 9).
41 – 50 Three cases (4, 11, 16).
51 – 60 Two cases (5, 15).
61 – 70 Two cases (12, 14).
71 – 80 Two cases (8, 13).

Sex

There were 16 females and only 2 males in this series.

Symptoms of Oesophageal Perforation

These vary somewhat with the size and acuteness of the perforation, though some of the most acute and fatal conditions have been produced by small perforations. With perforations that develop slowly following necrosis of the oesophageal wall, sufficient reaction may develop to localize the infection or limit the disease. In typical fulminating cases the symptoms are alarming and classical, with death in 36 hours in untreated cases.

The first symptom is pain, which varies greatly in site and intensity. The site of the pain depends on the level of perforation. If the perforation is in the neck, then pain will be localized to this region, but as the infection spreads down to the mediastinum, pain in the back and between the shoulders will be felt.

In perforations of the intra-thoracic oesophagus severe pain may be felt in the back and may be pleuritic in nature. If, however, the perforation is immediately supra-diaphragmatic, a referred pain to the shoulder will be felt, or pain may be experienced in the epigastrium and costal margin. In the first instance it may be difficult to distinguish the pain on swallowing which will accompany an oesophageal abrasion from that due to an actual perforation. However, in either event appropriate chemotherapy and a close watch on the patient are most essential. Oesophagoscopy at this stage will help distinguish the two, but it is said that the pain due to an abrasion will be felt with each act of swallowing whereas that from a foreign body may be felt only at times, depending upon the position of the foreign body.

The intensity of the pain is most variable. In some the pain has been slight, in others severe, and in several so extreme that they have been in the most profound distress with every act of swallowing, movement or respiration. In spontaneous perforations of the oesophagus the pain may simulate that of perforated peptic ulcer, but in the former the pain occurs during an attack of vomiting, whilst in the latter the vomiting follows the pain.

An early symptom has been dysphagia, in some complete, with inability to swallow saliva: in others, severe pain with every swallow but ingestion to all intents satisfactory until autopsy has shown food detritus in the pleural cavity. A few have had blood stained vomitus.

Most cases have felt feverish soon after perforation, though in some this has been masked by early chemotherapy. In several of the worst cases the temperature has been subnormal due to profound shock, and the patients have exhibited the symptoms of collapse, prostration and dehydration. Few of the cases have shown respiratory distress early, but ultimately this has been inevitable except in one delayed cervical abscess. As the disease has progressed, rapid shallow respirations, cyanosis and dyspnoea have been prominent from mediastinal obstruction, pleural involvement with effusion and especially in cases where, following instrumental dilatation with perforation, a tension pyo-pneumo-thorax has ensued. These patients are restless and apprehensive and several have terminated in coma.

Signs of Oesophageal Perforation

Surgical emphysema is a common feature and will be present in the neck at an early stage. It is surprising how rapid will be the development of this important sign, even in low mediastinal perforations. Tenderness along the anterior border of the sterno-mastoid is another early constant sign, as is the splinting of the patient's neck muscles in cervical perforations.

If the perforation has been intra-pleural, there will be signs of a pyo-pneumo-thorax or of an effusion. If the perforation is immediately above the diaphragm or if the intra-abdominal part of the oesophagus is involved, there may be signs of a retro-peritoneal inflammatory process. There may be epigastric guarding and tenderness.

Signs of mediastinal obstruction follow on the increased

Ever Widening . . .

Chloromycetin, the first synthetic antibiotic, stands at the centre of an ever-widening circle of chemotherapeutic achievement, from its first clinical successes against the Rickettsiæ; next against many viruses, then Gram-negative and Gram-positive organisms. With its variety of forms, easy administration and versatility, Chloromycetin is the dominant antibiotic of today—and its full impact has yet to be measured.

CHLOROMYCETIN **CAPSULES**
PÆDIATRIC CHLOROMYCETIN **PALMITATE**
CHLOROMYCETIN **OPHTHALMIC**
CHLOROMYCETIN **OPHTHALMIC OINTMENT**
CHLOROMYCETIN **CREAM**
CHLOROMYCETIN **TOPICAL**

CHLOROMYCETIN

Parke, Davis & Company, Limited *Inc. U.S.A.*, Hounslow, Middlesex, England. 430

Further information from any branch of LENNON LTD.

pressure of the air and oedema in the mediastinum. This will be evidenced by cyanosis, and distended veins in the neck.

Signs of surgical shock may present themselves early in the fulminating variety, may be delayed in the small, more localized cases or, rarely, may not occur at all when localization is early and complete. Leucocytosis has been a most variable sign and has often been absent in the most fulminating cases.

X-ray signs are of considerable value when present. They may, however, be negative if taken immediately or soon after perforation. In the neck gas will be noticed in the tissues and forward displacement of the trachea will be visible on a lateral picture (Figs. 14, 17). P.A. films of the chest will show broadening of the superior mediastinum and a Lipiodol swallow may show a filling defect or extravasation outside the oesophagus (Figs. 7, 19). Mediastinal emphysema, forward displacement of the oesophagus and increased density of the normal translucent retro-cardiac space are often shown on the lateral films (Fig. 6).

Pleural effusion (Figs. 1, 9) and mediastinal abscess with fluid levels (Fig. 8) are demonstrable in the more severe cases.

TREATMENT

1. If a perforation is noticed at the time of oesophagoscopy, immediate operative closure should be performed and the area drained. If the perforation occurs in an inflamed area, however, drainage only is indicated.

2. If the perforation is recent and small, as from a puncture from a fish bone, immediate oesophagoscopy with removal of the bone should be performed and intensive conservative treatment detailed below should be employed. A very careful watch for mediastinitis, empyaema or abscess must be maintained, and appropriate drainage used early. Drainage in the neck consists of cervical mediastinotomy through a transverse collar incision, whilst drainage in the thorax consists either of a posterior extra-pleural mediastinotomy, or a formal trans-pleural thoracotomy.

3. Gastrostomy for feeding purposes should not be resorted to early, but should only be used in complicated cases.

4. Delayed resection of strictures and reconstitution of a swallowing mechanism is necessary in those cases in which perforation has followed dilatation of caustic strictures.

5. In cases of suspected perforation or in those in which a conservative regime is advised the following measures are essential:

6. Surgery is not advised in the moribund, in minute perforations in which intensive conservative measures can be employed immediately or in those in whom the perforation is localized to the cardia with evidence of retroperitoneal localization. Surgery is delayed in those with adequate localization.

7. No standard line of treatment can be postulated dogmatically for the management of these cases, each having to be assessed on its merits. Antibiotics are only an adjunct to surgery, which is the main line of treatment.

(a) Nothing by mouth except antibiotic lozenges.
(b) Intensive chemotherapy (half-a-million units of penicillin and 0.5 gm. of streptomycin by injection 6-hourly). We have not employed intravenous Terramycin unless cultures have indicated its use.
(c) Continuous intravenous feeding with an adequacy of fluid, electrolytes, vitamins and proteins.
(d) Radiological control with Lipiodol swallows is essential.
(e) Early surgery if conservative treatment fails, or suspected perforation is proved.

ANALYSIS OF TREATMENT

A. *Conservative*. Recovery in 4 cases, viz. Nos. 4, 10, 12 and 13. Death in 3 cases, viz. Nos. 2, 6 and 8.

B. *Surgical*.

1. *Cervical Drainage*. Recovery in 3 cases (Nos. 3, 14 and 15).

TABLE I

No.	*Name*	*Sex*	*Age*	*Site*	*Aetiology*	*Duration*	*Status*	*Treatment*	*Result*
1.	M. G. W.	F	38	Arch of aorta	O & F.B.	5 days	H	Mediastinotomy	D
2.	W. L.	F	23	Lower	O & D	1 day	H	Conservative	D
3.	G. K.	F	35	Neck	O & F.B.	15 days	P	Cervical drainage	R
4.	A. L.	F	43	Arch	O & D	12 days	H	Conservative	R
5.	F. S.	M	59	Neck	F.B.	4 days	H	Mediastinotomy, Empyaema Dr	D
6.	S. H.	F	40	Lower	O & D	4 days	H	Conservative	D
7.	M. S. G.	F	30	Arch	Ext. Violence	3 days	P	Mediastinotomy, Empyaema Dr	D
8.	C. K.	F	72	Neck	O.	36 hours	H	Conservative	D
9.	C. F. K.	M	33	Lower	F.B.	36 hours	H	Trans-thoracic mediastinotomy	R
10.	A. M. N.	F	16	Lower	O & D	2 days	H	Conservative	R
11.	A. de J.	F	62	Neck	O & F.B.	18 hours	P	Cervical Dr, Extra-pleural mediastinotomy, gastrostomy	R
12.	E. J. W.	F	66	Lower	F.B.	8 hours	P	Conservative	R
13.	C. S.	F	72	Neck	O & F.B.	24 hours	H	Conservative	R
14.	D. K.	F	65	Neck	F.B.	5 days	P	Cervical Drainage	R
15.	J. J. F.	F	55	Neck	Oesophagus	48 hours	P	Cervical Drainage	R
16.	A. B.	F	41	Arch	F.B.	24 hours	P	Trans-thoracic mediastinotomy	R
17.	E. U.	F	2½	Arch	Chemical	3 months	P	Conservative and gastrostomy	R
18.	Y. M.	F	2½	Neck	F.B.	3 days	P	Oesophagoscopy and conservative	R

Aetiology: O = Oesophagoscopy.
F.B. = Foreign body.
O & D = Oesophagoscopy and dilatation.
Chemical = Caustic soda perforation.
Duration: Indicates the time after perforation that we first saw the case.

Status: H = hospital case.
P = Private case.
Treatment: Dr = Drainage.
Result: D = Death.
R = recovery.

2. *Extra-pleural Mediastinotomy.* One death (Case 1).
3. *Extra-pleural Mediastinotomy,* plus intercostal drainage for empyaema. Death in 2 cases (Nos. 5 and 7).
4. *Trans-thoracic Mediastinotomy* and empyaema drainage. Recovery in 2 cases (Nos. 9 and 16).
5. *Cervical Drainage,* extra-pleural mediastinotomy, empyaema drainage and gastrostomy. Recovery in one case (No. 11).
6. *Gastrostomy.* Recovery in one case (No. 17).
7. *Oesphagoscopy.* Recovery in one case (No. 18).

MORTALITY

Hospital Cases. Of 9 cases, 5 died (55% mortality).
Private Cases. Of 9 cases, one died (11% mortality).
Total Mortality. Of 18 cases, 6 died (33⅓% mortality).

MORTALITY IN RELATION TO SITE OF PERFORATION

TABLE 2

Site	*Hospital*	*% Mortality*	*Private*	*% Mortality*	*Case Mortality*
Neck	1 death in 3	33⅓%	0 in 5	0%	1 death in 8 (12½%)
Aorta	1 death in 2	50%	1 in 3	33⅓%	2 deaths in 5 (40%)
Lower end	3 deaths in 4	75%	0 in 1	0%	3 deaths in 5 (60%)

CASE HISTORIES

Case 1. Mrs. M. G. W., aged 38 years, was admitted on 6 July 1947 to the E.N.T. Department of the General Hospital with a history of caustic stricture for which dilatation, the last in 1944, had been effective. Three hours before admission she had swallowed a duck bone and this was followed by severe retro-sternal pain for which oesophagoscopy was performed with the removal of a bone. On 7 July penicillin, 50,000 units and Sulphadiazine one gramme were given 3-hourly. On 8 July her temperature was 101.5° F and she complained bitterly of severe pain over the middle of the sternum and over both lung bases. By the 9th she had marked dysphagia with severe bilateral shoulder tip pain. Surgical emphysema of the left supra-clavicular region, distended veins in the right side of the neck and diminished air entry over the right lower lobe were recorded. She swallowed a Ryle's tube which passed readily into the stomach and through this she was fed. On the 11th we were asked to see this patient and found her in very poor general condition and gave her intravenous therapy and 'Doca'. A portable X-ray (Fig. 1) showed a large mediastinal abscess lying para-vertebrally and extending from the first to the sixth ribs. A large right basal pleural effusion was also present.

Right posterior mediastinotomy was performed that afternoon under general anaesthesia administered by Dr. C. Frost. Portions of the 4th and 5th ribs were removed posteriorly to the transverse processes. A tense, foul mediastinal abscess was drained extra-pleurally and an intercostal catheter introduced into the right sero-purulent pleural effusion. Her condition gradually improved post-operatively and X-rays showed the drainage tube lying in the mediastinal abscess which was now much smaller. The right lung was well expanded and by the second post-operative day she appeared very fit. During the night of the 15th, she became irrational and terminated with an hyper-pyrexia of 106° F. Autopsy showed suppurative mediastinitis, a small necrotic oesophageal perforation at the level of the azygos vein, bronchopneumonia and widespread pyaemia.

Had fluids been withheld after oesophagoscopy and earlier mediastinal drainage been advised, this patient's life might well have been saved.

Case 2. Mrs. W. L., aged 23 years, was admitted to the

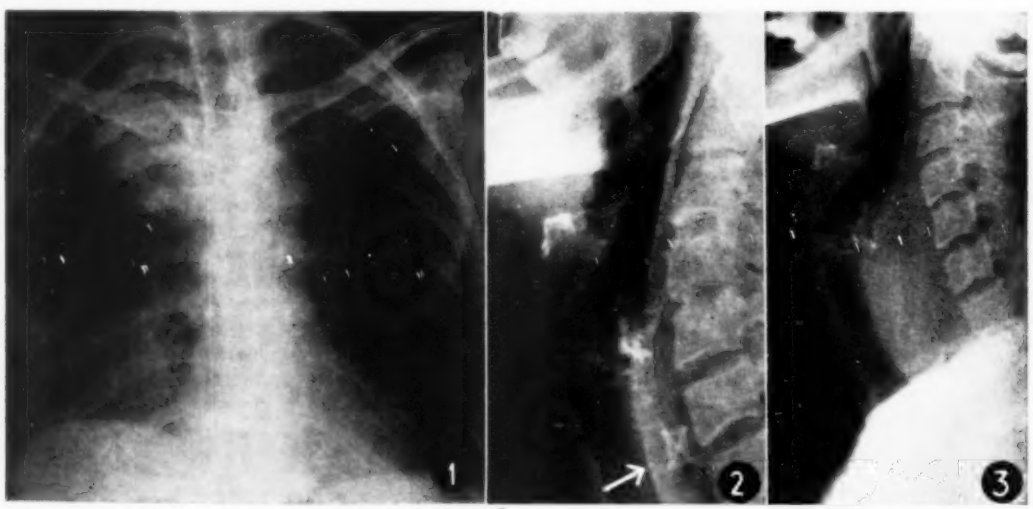

Fig. 1 (Case 1): Chest X-ray showing a large right mediastinal abscess with loculi, together with a right pleural effusion.
Fig. 2 (Case 3). Lateral X-ray of the neck on 24 September 1948 showing a fish vertebra impacted in the post-cricoid cervical oesophagus. Note that the distance between the back of the trachea and the cervical vertebrae is normal.
Fig. 3 (Case 3). Lateral X-ray of the neck 15 days later showing an increased distance between trachea and vertebrae due to a retro-oesophageal abscess.

E.N.T. Department on 1 December 1948. On the 3rd, oesophagoscopy with dilatation of a 6-week-old caustic stricture was performed. That night her temperature rose to 101° F. We saw her first on the evening of the 4th, when she appeared moribund. Despite immediate aspiration of several pints of gastric content from a left pyo-pneumo-thorax and resuscitative measures, she died a few hours afterwards. No autopsy records are available.

Case 3. Miss G. K., aged 35 years, swallowed a fish bone on 24 September 1948, and felt this impact in her throat (Fig. 2). That evening a fish vertebra was removed from the cervical oesophagus. She was discharged the following day, although she could not swallow easily and was given penicillin. By the 28th she complained of right-sided earache and pain low down on the right side of the neck, made worse by swallowing. We first saw this patient on 8 October 1948, when she stated that she had complete dysphagia, inability to swallow her saliva and a constant cough from laryngeal irritation. She showed tenderness to the right of the cervical oesophagus where there was a brawny induration. X-ray (Fig. 3) showed a large retro-oesophageal cervical abscess with no extravasation of barium. She was afebrile, her pulse was 80 per minute, and there was no leucocytosis. She was admitted and as no improvement followed chemotherapy, a large retro-oesophageal abscess was drained through a vertical incision along the anterior border of the right sterno-mastoid. Foul pus (sterile on culture) was evacuated from a shaggy abscess cavity which extended proximally behind the pharynx and distally to the level of the thoracic inlet. Penrose drains were used and 2 small tubes introduced separately into the retro-oesophageal space for post-operative instillation of penicillin. Intravenous feeding was continued with for 5 days, although she was immediately able to swallow her saliva. Methylene blue was given by mouth and, as no dye appeared on the dressing, she was allowed soft nutritious feeds which she swallowed without difficulty. The wound healed by first intention and she was discharged home 15 days after operation. A lateral X-ray on 26 October 1948 showed a normal soft tissue film with a normal barium swallow.

In January 1949 Mr. J. Penn excised the vertical scar which was limiting movement of the neck and performed a Z-plastic operation with complete relief of her symptoms.

Case 4. Mrs. A. L., aged 43 years, was admitted to the E.N.T. wards following ingestion of caustic soda. On 26 January 1949 dilatation of an oesophageal stricture was performed and following this she was able to swallow solids for a week, when a barium swallow showed an oesophageal diverticulum above the stricture (Fig. 4). Following a further dilatation she complained of severe stabbing pain on swallowing, over the right costal margin, with pain in the right posterior chest. She developed a high fever, was put on intravenous feeding and intensive chemotherapy.

X-rays (Fig. 5) showed marked broadening of the mediastinum on the right extending from the neck of the 4th rib above to the 8th rib below. The lateral film (Fig. 6) showed forward displacement of the trachea by the peri-oesophageal mediastinal abscess.

When we first saw her on 15 February 1949, she was afebrile, her pains had abated, and with difficulty she was able to swallow fluid. A barium swallow at this time showed (Fig. 7) gross extravasation of barium into the middle and posterior mediastinum.

In view of the mediastinitis complicating the stricture, intrathoracic oesophago-gastrostomy was advised; and in view of the extensive leakage into the mediastinum at the level of the aortic arch, the right-sided approach was employed. On 24 February 1949 the abdomen was opened, the stomach mobilized according to the technique of Sweet,[8] the abdominal oesophagus freed, the oesophageal hiatus stretched and the lower 2" of the thoracic oesophagus mobilized by blind finger dissection. The abdomen was closed and a classical right postero-lateral thoracotomy with resection of the 5th rib was performed. The oesophagus was densely adherent in the mediastinum but was isolated and an end-to-side oesophagogastrostomy performed at the level of the third thoracic vertebra.

Operation was performed under general anaesthesia administered by Dr. F. W. Roberts, and her condition on return to the ward was excellent. Thirty-six hours after operation she had the first of 3 attacks of sudden profound collapse, from which she rapidly improved with plasma, 'Doca' and atropine, which was exhibited as these were thought to be vagal attacks. Oral feeding was started on the seventh post-operative day, when a Lipiodol swallow showed a patent anastomosis. Several months after operation dilatation for narrowing at the anastomosis site had to be performed, but at the present time she swallows quite normally, and has no post-operative sequelae.

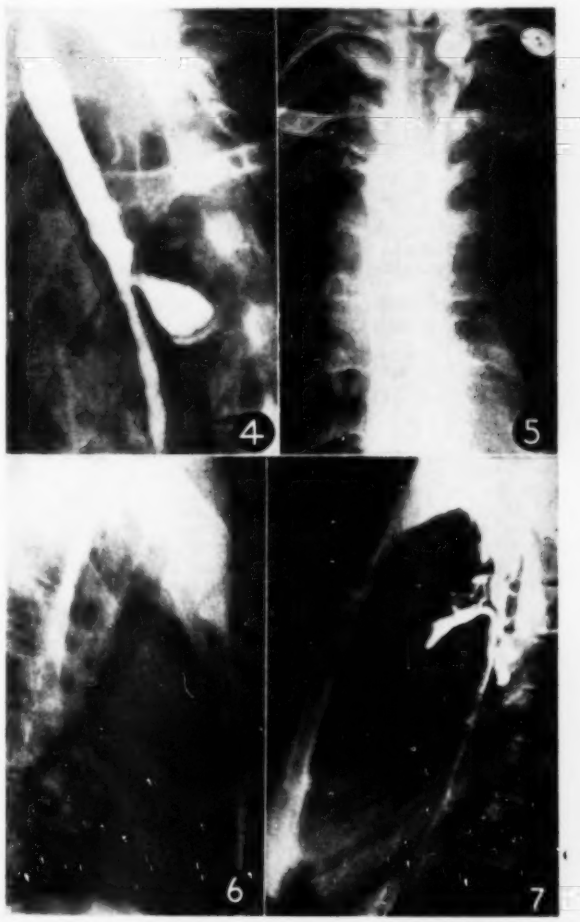

Fig. 4 (Case 4). Oblique barium swallow on 31 January 1949 after oesophagoscopy, showing localized perforation with pulsion diverticulum.
Fig. 5 (Case 4). Postero-anterior chest film showing broadening of the superior mediastinum after further oesophageal dilatation.
Fig. 6 (Case 4). Lateral chest film showing forward displacement of the trachea by a peri-oesophageal mediastinal abscess.
Fig. 7 (Case 4). Lateral chest film after a barium swallow showing gross irregular extravasation of barium into the mediastinum. (We prefer Lipiodol.)

Case 5. Mr. F. S., aged 59 years, swallowed a duck bone on 21 April 1949. His general practitioner referred him to an E.N.T. surgeon who had him X-rayed, but as the radiologist reported that the films and barium swallow were normal, he was sent home without oesophagoscopy. The severe pain in the neck and dysphagia persisted, and during the night of 23 April he developed a sudden severe pain under the upper

sternum. On 24 April he was admitted to the General Hospital under Mr. Douglas, who asked us to see the patient. The patient was shocked, cyanosed and breathless, with a temperature of 100° F, a pulse of 120 per minute, respirations of 35 per minute and a blood pressure of 95/60 mm. Hg. He had extensive bilateral cervical emphysema, tenderness in the left supra-clavicular fossa with signs of a left pleural effusion. X-ray revealed broadening of the superior mediastinum with fluid at both bases. A barium swallow with portable films showed an irregular post-cricoid filling defect. His surgical shock was treated, he was put on intensive chemotherapy and operated upon that evening under a general anaesthetic administered by Dr. Jeffs. At oesophagoscopy a wish bone was removed and a necrotic perforation seen in the cervical oesophagus. Bronchoscopic aspiration preceded left posterior mediastinotomy through the resected fourth rib bed. There was an extensive phlegmonous mediastinitis. The mediastinum and the pleural cavity were drained and at the end of the operation his general condition had improved. On the first post-operative morning he appeared rational, but later lapsed into coma, rapidly deteriorated and died.

Autopsy confirmed a suppurative mediastinitis, an oesophageal perforation and a left empyaema. It also showed extensive suppuration in the deep cervical glands on the left side of the neck.

As this case shows, the presence of persistent pain in the neck and dysphagia should always be treated with grave suspicion.

Case 6. Mrs. S. H., aged 40 years, had oesophagoscopy and dilatation in the E.N.T. Department for a caustic stricture on 7 October 1949. On the following day she complained of severe pleuritic pain and breathlessness. Her respirations were 28 per minute, her pulse rate 128 per minute and a portable X-ray showed a massive hydro-pneumo-thorax, ateleotasis of the left lung and mediastinal displacement to the right. Despite penicillin her condition had deteriorated by 9 October, when her temperature was 97.8° F, with a pulse rate of 168 per minute and respirations of 38 per minute. We were called to see this patient the following morning and found her moribund with a left tension pyo-pneumo-thorax. Autopsy showed a traumatic perforation of the oesophagus, 4" below the site of the stricture just above the diaphragm. Several pints of foul gastric fluid and food debris filled the left pleural cavity.

Case 7. Mrs. M. S. G., aged 30 years, was admitted to a nursing home on 17 April 1950. At the age of 5 she had swallowed caustic soda. From that time she had persistent dysphagia. Food used to impact in her cervical oesophagus, but she dislodged it by massaging it down. On the day of her admission, whilst attempting to massage a food bolus down the oesophagus, she experienced severe pain between the shoulder blades and over the spine. On the following day surgical emphysema was noted and antibiotics were prescribed. We saw her first on 20 April (3 days later) when she was cyanosed and disorientated with a temperature of 100° F, a pulse rate of 136 and a respiration rate of 40 per minute respectively. Her blood pressure was 90/50 mm. Hg. She had gross emphysema of the upper chest and neck with tenderness along the left sterno-mastoid. She had signs of a right pleural effusion. She was transferred and an X-ray showed (Fig. 8) gross surgical emphysema and a large right posterior mediastinal abscess into which ingested barium passed at the level of the fifth thoracic vertebra. Heroic doses of streptomycin and penicillin were given and after 1,000 c.c. of plasma had been administered, a right posterior mediastinotomy under general anaesthesia administered by Dr. C. Frost, was performed. Almost a pint of malodorous pus was evacuated from the abscess extra-pleurally; the right pleural cavity was also drained. Her general condition remained poor post-operatively although a portable X-ray (Fig. 9) showed the abscess cavity empty, the right lung expanded with no residual effusion. She continued to deteriorate and died on the 22nd. Autopsy confirmed the operative findings and also showed a left basal empyaema.

Case 8. Mrs. C. K., aged 72 years, had a diagnostic oesophagoscopy performed in the E.N.T. Department on 1 June 1950. The report of this procedure states: 'An acute hypopharyngitis. There was desquamation with bleeding to the touch. The same condition involved the upper half of the oesophagus.'

Eight hours after oesophagoscopy surgical emphysema was noted, and 26 hours later we saw her in consultation, and in view of her frail condition, age and known oesophagitis, conservative treatment was advised. During the night of 3 June, she became irrational and died.

Autopsy showed pharyngitis. The oesophagus showed extensive phlegmonous oesophagitis. There was a small perforation in the posterior wall of the upper third associated with a retro-oesophageal abscess, and septic mediastinitis. Blood-stained fluid was present in both pleural cavities together with a small pericardial effusion.

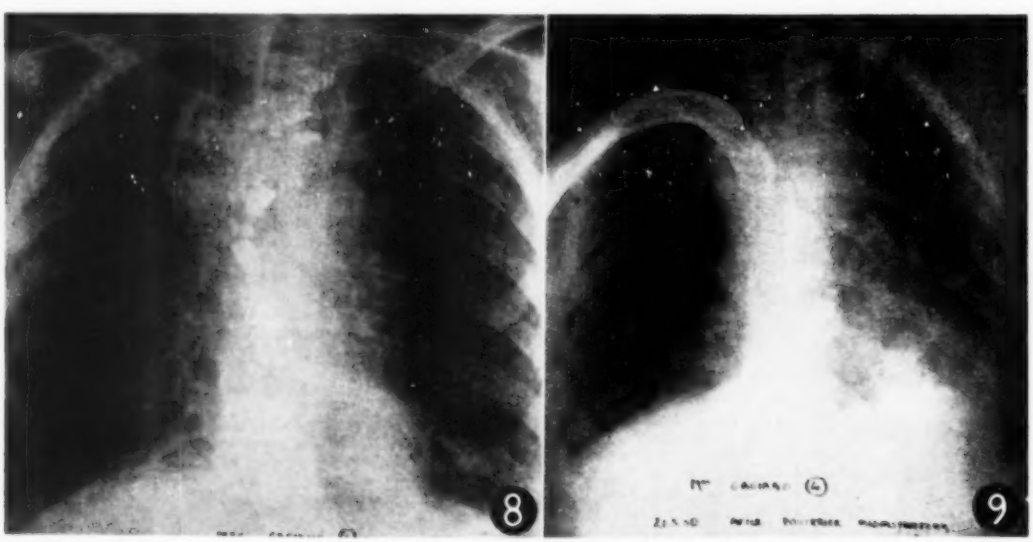

Fig. 8 (Case 7). Postero-anterior chest film after a barium swallow showing gross surgical emphysema, mediastinal abscess with a fluid level and irregular mediastinal extravasation of barium.
Fig. 9 (Case 7). Portable chest film after right posterior mediastinotomy. The mediastinal abscess has been drained but there is a left basal empyaema and patchy atelectasis of the left lower lobe.

Case 9. Mr. C. F. G., aged 33 years, swallowed a fish bone on the night of 30 August 1950. This stuck in his throat and he ate some dry bread and stated that he felt the bone travel further down his gullet. He tried to carry on with his night shift, but as he had intense pain, he was admitted to Mr. Tucker's ward in the General Hospital on 31 August. There he had severe constant epigastric pain with dysphagia and breathlessness. Lipiodol swallow and X-ray of his chest were reported upon as negative but his white cell count was 21,800 per c.mm.

On the day following his admission his general condition was unchanged, but the pain had now passed to the right hypochondrium and to the small of his back, and was referred to the right shoulder on deep breathing. Further X-rays showed some mottling of the right cardio-phrenic angle, and the diagnosis of low oesophageal perforation with mediastinitis and empyaema was made, and operation performed.

Bronchoscopic aspiration of the tracheo-bronchial tree allowed a tranquil general anaesthetic. Oesophagoscopy showed a small traumatic perforation on the right lateral wall an inch above the cardia. Methylene blue was introduced into the oesophagus. Right postero-lateral thoracotomy showed a large purulent fibrinous exudate. The posterior inferior mediastinum was incised and found to be markedly oedematous and congested. No methylene blue was found. A catheter was laid in the mediastinum and a Tudor Edwardes tube inserted. The severe abdominal pain disappeared entirely after operation and he recovered uneventfully without any late sequelae.

Case 10. Miss A. M. N., aged 16 years, was admitted to the E.N.T. wards for dilatation of a caustic stricture. Following this procedure on 23 February 1951, she complained of epigastric pain, for which Crysticillin was prescribed. We saw her in consultation on the 25th, and treated her conservatively, giving her penicillin and streptomycin 3-hourly, antibiotic lozenges by mouth and intravenous feeding.

A portable Lipiodol swallow showed a stricture of the oesophagus commencing at the seventh thoracic vertebra. A small niche 2" below this (Fig. 10) suggested a perforation.

On 26 February she complained of pains in both loins, the epigastrium and back of the right shoulder on coughing. She presented marked rigidity of the epigastrium. We considered this to be a localized low perforation and with this conservative regime, she rapidly improved. By the 20th she was able, with some difficulty, to swallow fluids, and operation was advised.

On 21 March 1951, abdomino-thoracic oesophago-gastronomy was performed under general anaesthesia administered by Dr. F. W. Roberts. The operation undertaken was similar to that described in Case 4, except that the anastomosis was made easier by the presence of a somewhat distended but otherwise normal proximal oesophagus.

Her post-operative convalescence was uneventful and she has continued to swallow normally without any symptoms. Barium swallow showed a good calibre at the anastomosis (Fig. 11) and the pyloric antrum passing through the hiatus (Fig. 12).

Case 11. Mrs. A. de J., aged 62 years, swallowed a fish bone which stuck in her gullet on 3 July 1951. She went to her doctor on 6 July, and X-rays showed a foreign body in the cervical oesophagus, opposite the seventh cervical vertebra. Oesophagoscopy was attempted that evening, but there was marked oedema of the post-cricoid space, bleeding ensued and the foreign body was not removed. We saw her first on the morning of 7 July, when she was unable to swallow her saliva and complained of severe pain in the neck. She had surgical emphysema, tenderness and slight fullness of the right side of the neck. She was given intensive antibiotic therapy by injection, antibiotic lozenges by mouth and intravenous feeding. Her condition improved, but on 9 July, X-ray showed some broadening of the superior mediastinum with forward displacement of the trachea. A Lipiodol swallow on the following day showed persistent obstruction, but her general condition continued to improve. On 12 July she complained of severe pain in the back, and further X-rays showed increased broadening of the superior mediastinum into which Lipiodol tracked (Fig. 13).

On 12 July operation was undertaken. Oesophagoscopy showed an oedematous vascular area 1" below the cricoid. Below this was an irregular pit in the floor of the oesophagus. A retro-oesophageal abscess was then drained through a transverse cervical incision. A Penrose drain was passed into the superior mediastinum. On the following day large amounts of saliva drained through the cervical incision. Her condition improved, but on 17 July she again complained of severe pain in the back, and X-ray suggested continued broadening of the superior mediastinum.

Although she had been nursed flat, it was felt that saliva

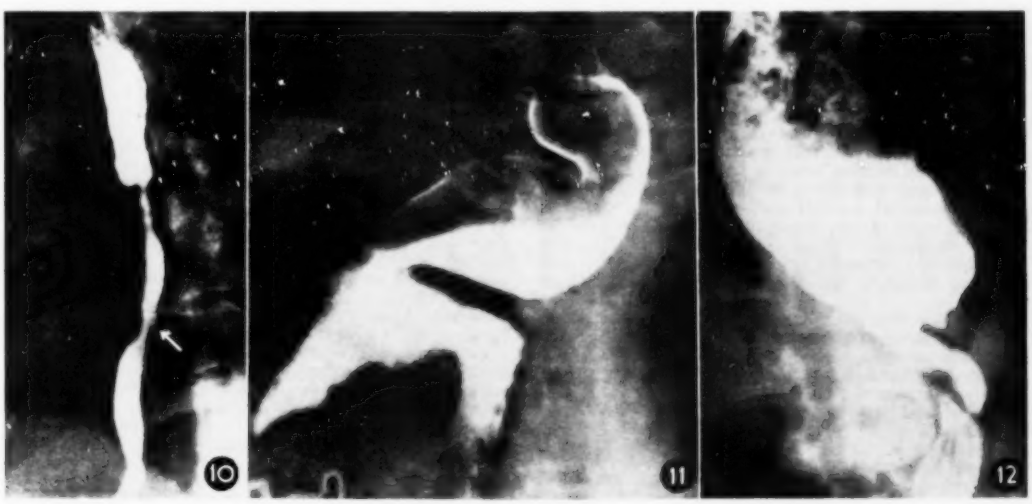

Fig. 10 (Case 10). Portable Lipiodol swallow 2 days after oesophageal dilatation confirms the presence of a caustic stricture with a small perforation on its posterior aspect 2 inches above the diaphragm.
Fig 11 (Case 10). Barium swallow showing a sigmoid-shaped proximal oesophagus with a good anastomosis between oesophagus and stomach at the level of the third thoracic vertebra in the *right* pleural cavity.
Fig. 12 (Case 10). Barium swallow showing the pyloric antrum passing through the oesophageal hiatus with the stomach passing to the right of the thoracic vertebra.

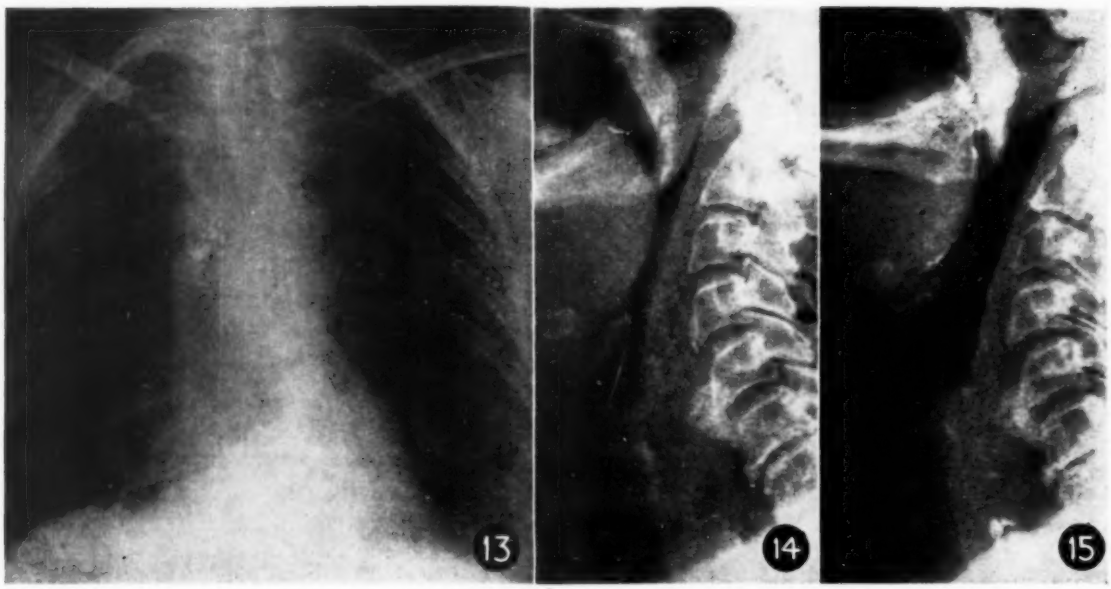

Fig. 13 (Case 11). Broadening of the superior mediastinum is shown and into this Lipiodol has tracked from a perforation of the cervical oesophagus.
Fig. 14 (Case 14). Lateral X-ray of the neck shows the very gross osteophytes on the front surface of the 5th and 6th cervical vertebra. The retro-tracheal space is markedly broadened by an abscess in which gas bubbles can be seen.
Fig. 15 (Case 14). Lateral X-ray of the neck after 3 days' conservative treatment. The retro-tracheal space is somewhat smaller, the gas bubbles are less marked and traces of Lipiodol can be seen outlining a chicken bone at the thoracic inlet.

and pus were draining into the mediastinum. Gastrostomy and posterior mediastonotomy were therefore performed. The mediastinum was indurated by a brawny oedema, but no frank pus encountered. Fifteen ounces of sero-fibrinous fluid was aspirated from the pleural cavity, into which an intercostal catheter was introduced. Her general condition rapidly improved after this, though she had a severe setback from a large gastric haemorrhage which was controlled by introducing 10 c.c. of topical thrombin with buffer solution through the gastrostomy tube, every 2 hours. A barium swallow on 11 August showed no abnormality, and she was discharged.

Case 12. Mrs. E. J. W., aged 66 years was admitted on the evening of 23 November 1951, with marked dysphagia, following the ingestion of a mutton bone at lunch. She had severe pain in the neck and low down in the small of her back. Oesophagoscopy revealed a small perforation in the posterior wall of the oesophagus, 5 cm. above the cardia. Conservative treatment was embarked upon and X-ray the following morning showed no extravasation of barium, although the pain in the back persisted, and she now had deep tenderness in the epigastrium.

On 27 November the barium swallow still showed slight upset of the swallowing mechanism at its lower end. From the 28th she was allowed sterile water by mouth, and was discharged from the nursing home on 30 November.

This case was diagnosed as having a low oesophageal perforation with spread through the hiatus into the retro-peritoneal tissues (Case of Dr. Malone).

Case 13. Mrs. C. S., aged 72 years, was admitted to the E.N.T. wards on 8 February 1952, with a story that she had swallowed a chicken bone 2 months before. Since that time she had experienced pain in her neck on eating, with marked dysphagia. A lateral X-ray of the neck on the day of admission is reported as showing a retro-tracheal cervical swelling, with an opaque linear foreign body.

Oesophagoscopy was performed on 12 February, the report of which states: 'Swelling with slight constriction at level of the crico-pharyngeus extending for about 2 inches. Pus discharged into the oesophagus from its right anterior wall.'

On 13 February she had a high temperature, complained of severe pain in the neck and when we saw her she was tender along the medial border of the right sterno-mastoid, deep to which was a tender, ill-defined swelling. Conservative treatment was embarked upon in this patient as she had glycosuria, hypertension, and because it was felt that although the oesophagoscopy was the cause of her perforated oesophagus, the presence of a chicken bone for the preceding 2 months had already caused sufficient peri-oesophagitis to allow localization. With this regime she settled down after an anxious 6 days' treatment, and was discharged fit from the ward on 5 March 1952.

Case 14. Mrs. D. K., aged 63 years, swallowed a fish bone on the evening of 9 April 1952. Following this she had a sore throat and dysphagia for which she was given sulpha drugs. Two days later she was seen by Dr. Friedlander of Durban with a temperature of 102° F and tenderness on the right side of the neck. A foreign body perforation of the cervical oesophagus was diagnosed. Large doses of antibiotics were prescribed and surgical treatment recommended. On 13 April she was admitted to a nursing home in Johannesburg with a temperature of 101° F, a pulse of 124 per minute, exhaustion and some dehydration. She had a palpable tender swelling on the right side of the neck. X-rays (Fig. 14) showed forward displacement of the trachea by an air-containing abscess, an opaque foreign body at the thoracic inlet with a very large osteophyte on the anterior surfaces of the fifth and sixth cervical vertebra. In view of the 4-day history, evidence of good localization, and the very large osteophyte, emergency operation was cancelled and conservative treatment embarked upon. By the 16th, X-rays (Fig. 15) showed some diminution in the size of the abscess. X-rays 2 days later showed no change. By 20 April, it was felt that the oedema at the cricoid region had probably abated, and that operation could safely be employed.

Under general anaesthesia administered by Dr. Sarkin, a long pharyngeal speculum was used and a large chicken bone removed an inch below the cricoid. No pus appeared so the cervical abscess was drained through a collar incision. Culture

of the pus yielded a growth of haemolytic *Staphylococcus aureus*.

Although her temperature had settled before operation, the discomfort in her neck was relieved immediately by these procedures, and feeding by mouth was started on 22 April. She was discharged on the 27th feeling perfectly fit apart from a little mucoid secretion from the sites of the drainage tubes. These healed readily, and when last seen on 4 July, she had no symptoms referable to swallowing, the incision in the neck was hardly discernible and her neck was mobile.

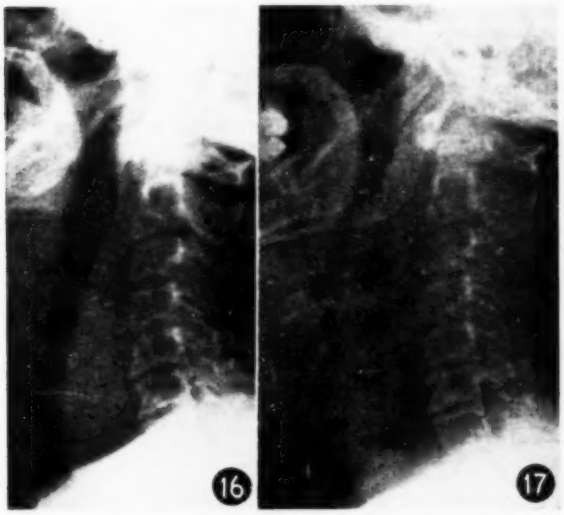

Fig. 16 (Case 15). Lateral X-ray of the neck showing a retro-tracheal oesophageal swelling 2 days after a diagnostic oesophagoscopy.
Fig. 17 (Case 15). Lateral X-ray of the neck 4 days after oesophagoscopy, showing marked extension of the swelling which has stripped the pharynx off the upper cervical vertebrae and which extends up to the basi-occiput. Gas can be seen in the abscess.

Case 15. Mrs. J. J. F., aged 55 years, swallowed a fish bone on the evening of 20 April 1952. As she had dysphagia, she was oesophagoscoped on 21 April and following this complained of severe pain in the shoulders and in the back of the neck; she was unable to swallow even fluids.

We saw her first on the evening of 23 April, when she had a temperature of 102° F. She had tenderness on the right side of the neck and very slight surgical emphysema. X-rays (Fig. 16) showed marked broadening of the retro-tracheal cervical space which contained several small air pockets. A barium swallow showed prolonged spasm but no obstruction to a pledget of cotton wool.

The diagnosis of post-endoscopic perforation of the cervical oesophagus, with good localization, was made and a conservative regime embarked upon. On the evening of the 24th she was markedly improved, but the local signs and symptoms persisted. Lateral X-ray of the neck on 25 April showed that the cervical abscess was now much larger, indenting the back wall of the trachea and stripping the pharynx forwards off the vertebrae as far as the basi-occiput (Fig. 17). This swelling could be seen in the pharynx on either side of the median raphe.

Immediate drainage of the retro-oesophageal abscess (under a general anaesthetic administered by Dr. C. Sarkin) was performed. A collar incision was made and a tense retro-oesophageal abscess extending up to the basi-occiput, down to the thoracic inlet, and across the midline to the left carotid was opened and drained, in a similar fashion to that in Case 3. Following operation her condition immediately improved and she was discharged on 6 May 1952.

Case 16. Mrs. A. B., aged 41 years, swallowed a mutton bone on 23 February 1952. She reported to the Casualty Department, General Hospital and as a barium swallow was reported upon as being normal, she was sent home. She was seen by Dr. H. Penn the following evening, with dysphagia and severe pain in the back, radiating along the fourth rib, to the front. We saw her in consultation and admitted her to the nursing home, with the diagnosis of a foreign body perforation of the oesophagus and parietal pleural involvement. A Lipiodol swallow with a pledget of cotton wool showed a hold-up opposite the fourth thoracic vertebra.

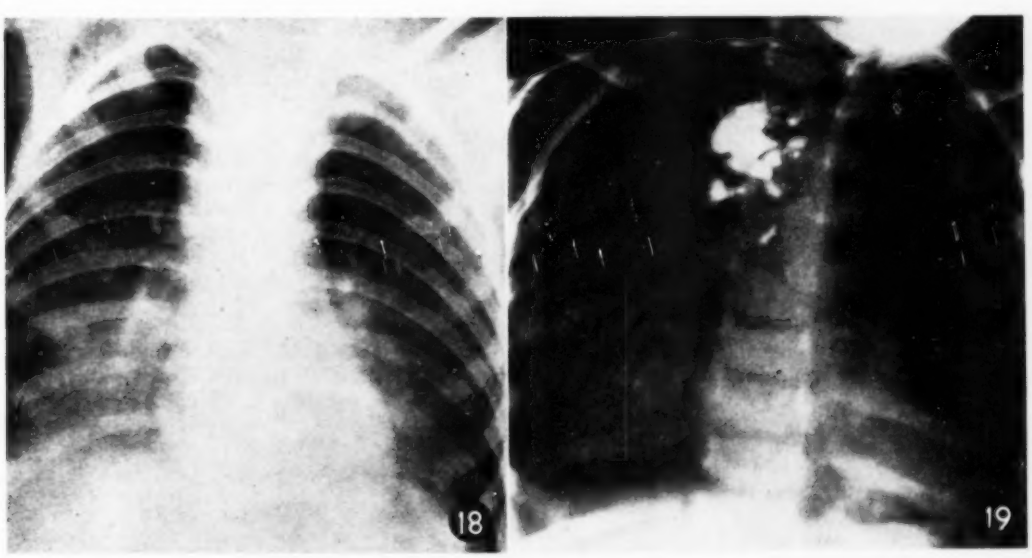

Fig. 18 (Case 17). Chest film showing a broadening of the superior mediastinum with a right lower lobe inhalation pneumonia in an acute caustic stricture of the oesophagus.
Fig. 19 (Case 17). This film shows a Lipiodol swallow with extravasation of oil into a superior mediastinal abscess. The inhalation pneumonia has cleared following gastrostomy and antibiotic therapy.

Operation was undertaken on the night of 24 February, under general anaesthesia administered by Dr. C. Frost. Oesophagoscopy showed the cotton wool impacted, but no foreign body could be seen, though there appeared to be a small perforation on the right lateral wall. Methylene blue was introduced down the oesophagoscope. Formal right postero-lateral thoracotomy showed an acute purulent pleuritis, with marked oedema around the oesophagus. As the finger passed along the posterior mediastinum, a sharp piece of bone was felt projecting through the pleura for about half an inch. When this was removed it proved to be an inch long with its mediastinal portion stained with methylene blue. The mediastinum was opened and drained as was the pleural cavity. From this operation she recovered uneventfully and was discharged home on 9 March.

The presence of parietal pain in this case was, in our opinion, an urgent indication for operation.

Case 17. A child, E. U., aged 2 years 8 months, swallowed caustic soda in February 1952, when she was admitted to a Reef hospital and was discharged after 10 days. Following this the child swallowed food but immediately regurgitated it. This continued until the child's admission to the Children's Hospital on 28 April 1952. Her general condition had deteriorated greatly, with gross weight loss, pallor and extreme prostration. The child was febrile, with moist sounds in the right lower lobe (Fig. 18) and following intravenous therapy and antibiotics showed marked improvement.

On 3 May we saw the child in consultation with Dr. Strawbaun. The X-rays (Fig. 19) showed marked extravasation of Lipiodol into the mediastinum with oesophageal obstruction. Mr. Zadikoff performed an urgent gastrostomy and, by 12 May, the child's condition had improved dramatically with marked gain in weight, lack of fever and clear lung fields. On 20 May, a Lipiodol swallow showed no oesophageal leak but there was almost complete obstruction at the level of the fourth intervertebral disc. On 19 June 1952 we oesophagoscoped this patient and this showed an ulcerating congestive stricture 6 cm. below the cricoid. The child was discharged on 26 May, and will subsequently undergo either a left trans-thoracic oesophago-gastrostomy, or oesophago-jejunostomy.

Case 18. A child, Y. M., aged 2 years 9 months, after having eaten a boiled egg on Sunday, 11 May 1952, was unable to retain any solids. She was seen and X-rayed on the 13th and the diagnosis of an opaque foreign body in the cervical oesophagus was made. There was a large retro-tracheal swelling and when we saw her at Dr. Javett's request on the 14th, she had a temperature of 102° F. looked toxic, but there was no surgical emphysema in the neck. Oesophagoscopy showed a large fragment of egg shell surrounded by pus. The shell was removed by fragmentation and a conservative regime for a cervical perforation of the oesophagus embarked upon. With this treatment her temperature settled and she was discharged home on 21 May, with a normal lateral X-ray of her neck and apparent freedom from pain on swallowing.

We should like to thank the doctors who referred these cases to us for opinion and treatment, and to acknowledge our debt for radiological help from Drs. V. Berman, A. Brotman, M. Fainsinger, H. Jackson and E. Samuel.

REFERENCES

1. Knox, L. (1951): S. Afr. Med. J., **25,** 37.
2. Phillips, W. L. (1951): S. Afr. Med. J., **25,** 494.
3. Seybold, W. D. *et al.* (1950): Surg. Clin. N. Amer., **30,** 961.
4. Korkis, F. B. (1952): Lancet, No. 6697, 4.
5. Weisel, W. and Raine, F. (1952): Surg. Gynec. Obstet., **94,** 337.
6. Slesser, B. V. (1951): Thorax, **6,** 389.
7. Fincher, E. F. and Swanson, H. S. (1949): Ann. Surg., **129,** 619.
8. Sweet, R. H. (1950): Thoracic Surgery, 1st Ed., p. 272. London: W. B. Saunders & Co.

LUMBAR INTERVERTEBRAL DISC HERNIATION

A METHOD OF CONSERVATIVE TREATMENT*

CARL W. COPLANS, M.R.C.S. (ENG.), L.R.C.P. (LON.), D. PHYS. MED. (R.C.S. & P.)†

Department of Orthopaedic Research, University of Cape Town

There can be little doubt of the propriety and necessity of conservative treatment in the early stages of low backache and sciatic pain of lumbar disc origin; in fact, the final decision to perform laminectomy is commonly based on the failure of conservative therapy.[1]

The long road to surgery is marked, for the patient, by a series of clinical trials whose diversity and multiplicity are signs of their unspecific character, and which have been aptly described as therapeutic nihilism.

Before the recognition of lumbar disc pathology as one of the commonest causes of low back pain, 'lumbago' was treated by a succession of methods in which empiricism was the common denominator. A number of these methods survive topically and are in common use. Two of these methods will be considered here.

1. *Manipulation.* While the mechanical procedures for manipulation of the lumbar vertebrae vary considerably, a concensus of standard works on manipulation shows that the most commonly employed single manoeuvre is the pelvic twist (Fig. 1).[2-5] This may be performed with or without anaesthesia. This manipulation is performed bilaterally and shows no critical evaluation of the mechanical conditions for which correction is being attempted. While many manipulative procedures have been described in great detail, few authors make an

Fig. 1. The Pelvic Twist. The most commonly employed manoeuvre in manipulation of the spine.

* A paper read at the South African Medical Congress, Johannesburg, September 1952.
† Honorary Specialist in Physical Medicine to the Cape Town Free Dispensary and the Somerset Hospital. Medical Officer, Department of Physical Medicine, Groote Schuur Hospital, Observatory, C.P.

attempt to elucidate the mechanism by which it is hoped to replace the herniation. Many patients' symptoms are increased by the blunderbuss type of manipulation which is commonly practised and the tragedy of paraplegia, through cauda equina pressure, is more than a remote complication of this empirical procedure.

2. *Traction.* Where manipulation fails traction is usually essayed. This may be sustained or unsustained. Sustained traction is carried out with the patient in bed. Skin traction is applied to both legs and suitable weights attached over pulleys at the end of the bed, the pull being kept constant day and night. During this trial the patient should receive adequate sedation. A suitable muscle relaxant such as Elixir Myanesin may also be employed with good effect. Experience suggests that should no relief be evident by the fifth day, further sustained traction is of no benefit.

Intermittent traction is given on a traction couch. The patient lies prone and the shoulders and thorax are fixed. A pull of 200–300 lb. is set up on the spinal column by means of a belt which encircles the pelvis and which is attached to a windlass. This pull is sustained for 20 minutes and is repeated after a rest of five minutes.

It is suggested that traction produces the following 2 effects:

(a) An increase in the interval between the vertebral bodies, thus enlarging the space into which the protrusion may recede.

(b) By tautening the joint capsule, that is the anterior and posterior common ligaments and the outer fibres of the annulus, a centripetal force is set up around the joint thus tending to squeeze the pulp back into place.[6]

Most standard anatomy text-books are emphatic that little or no rotation takes place in the lumbar vertebrae and they further point out that rotation is confined to the thoracic region.[7-9] Abbott[10] described 5 movements of the lumbar vertebrae: Flexion, extension, latero-flexion, rotation and torsion. Brailsford[11] reporting on a cine X-ray film showing the movements of the spine states that the rotational element in the lumbar vertebrae has been under-estimated.

Blair[12] agrees that some pure rotation of the lumbar

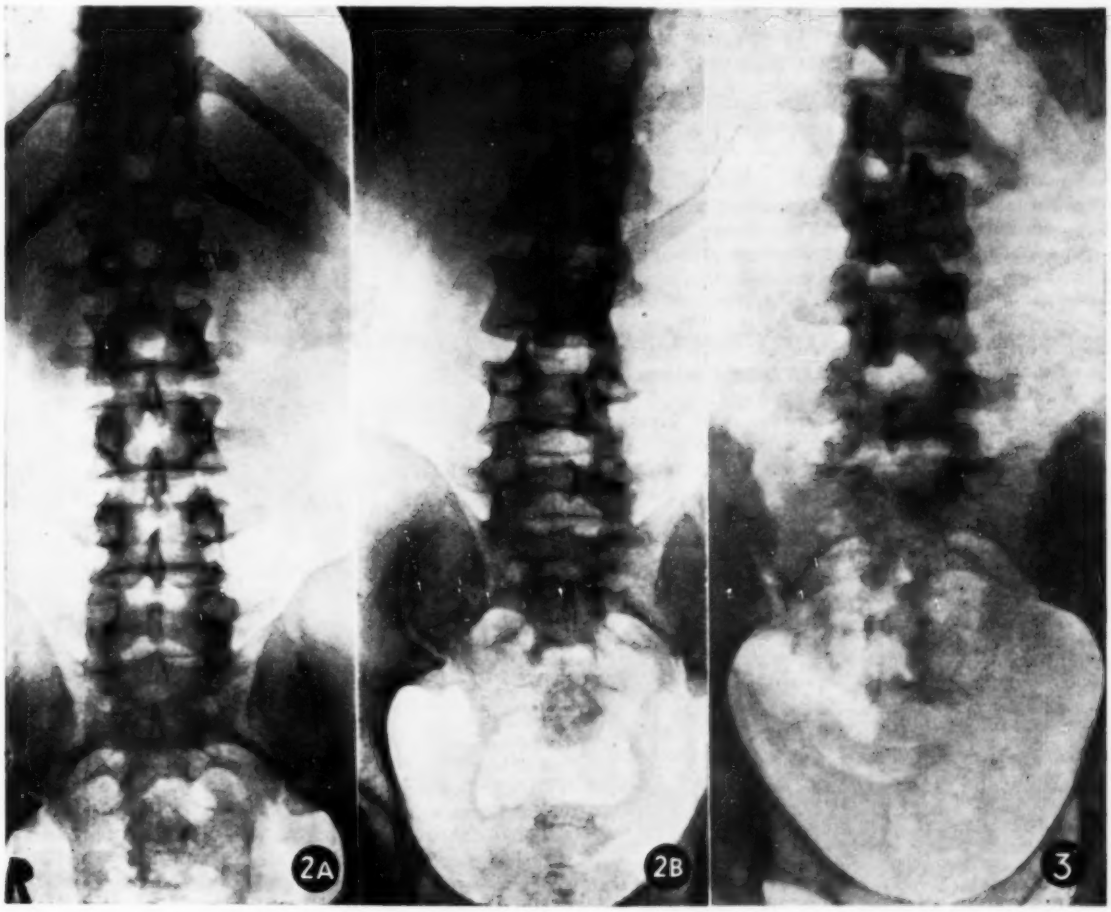

Fig. 2. (a) Resting spine. (b) Lumbar vertebrae showing rotation.
Fig. 3. Lumbar vertebrae showing rotation (dancer, *aet.* 16). A greater degree of rotation is demonstrated here.

vertebrae exists and ascribes it to laxity of the synovial joints.

The X-rays (Figs. 2 and 3) were taken to demonstrate the possible rotation in the lumbar spine. The first represents the A-P view of a healthy male of 19 years; the pelvis was fixed, the lumbar spine extended and the shoulders passively rotated. There is some latero-flexion to the left, but insufficient to account for the obvious rotation. The second film represents the identical view of the lumbar vertebrae of a female dancer taken under the same conditions. There is considerably more rotation demonstrated here than in the first film.

If free rotation takes place in the thoracic vertebrae alone then it must be mainly confined to the lower thoracic vertebrae, since the upper thoracic vertebrae are effectively splinted by the seven true ribs which, with their direct attachment to the sternum must limit rotation to some degree. There exists therefore, a group of 10 vertebrae (5 thoracic and 5 lumbar) which connect a relatively fixed portion of the spine to an absolutely fixed foundation, the sacrum.

It is through this link that the forces of rotation must be distributed, the main burden of which is felt in the lower lumbar spine where its firm anchorage to the sacrum is encountered. It is postulated therefore, that the lumbar intervertebral discs suffer their share of distortion and since they constitute a third of the length of the lumbar spine, sustain a great measure of the torsional strain, hereafter referred to as torque.

An analysis of the daily spinal movements of the average man, other than the heavy manual worker, shows that the most commonly repeated movements of the spine are extension and rotation, and it seems probable therefore that the mechanical components that limit these movements must suffer the maximum amount of stress and strain. In this respect, Ellis states: 'Whereas the strain of torsion and extension are largely borne by the fibres of the annulus, the vertical or weight bearing strain is borne by the nucleus pulposus'.[13]

Approximately 50% of intervertebral disc herniations follow gross trauma and in a great proportion of the remainder a history of apparently trivial insult can be elicited. Detailed analysis of the body position at the time of injury will often implicate a torsional factor. Lumbar intervertebral disc herniation appears to have become an occupational hazard of the long hitting professional golfer, particularly the exponents of the so called 'shut face' technique in which a powerful hip pivot or twist is used. Henry Cotton believes that this exaggerated and forceful hip twist is responsible for the low back disability from which these long hitters notoriously suffer.[14] This is a significant example since the forces acting on the lumbar spine during this manoeuvre are almost entirely extension and torsion.

It is interesting to conjecture at this stage on the functional anatomy of the discs themselves.

The inferior surface of one vertebral body is united to the superior surface of the vertebral body below it by the fibro-cartilaginous disc. The peripheral part of this structure is called the annulus fibrosus and is composed of dense fibro-cartilage. It consists of fibres which run obliquely between the two vertebrae and are arranged in concentric rings, the fibres in successive rings having opposite obliquities.[15]

The central part of the disc is called the nucleus pulposus and is contained in an envelope of fibro-cartilage which blends with the inner layers of the annulus. It is composed of mucoid material interlaced with fine fibres of fibro-cartilage. On each surface of the disc, both above and below, there is a thin layer of hyaline cartilage. The nucleus is under tension and bulges when the annulus is incised. It is believed that the tension is due to the elastic fibres of the annulus and not to the expansile force within the nucleus.[16] The disc distributes and transmits forces down the spine and allows segment mobility.

It would seem from the mechanical design of the disc that it is well able to adapt itself to the torque that is thrust upon it. As the force of the torque mounts, the concentric laminae, with their fibres running in opposite obliquities, act as a circular spring which winds up and unwinds as the torque varies in power and direction. Since little true flexion exists in the lumbar spine other than the abolition of lordosis, the architectural factors which mediate torsion continue to act in that region both in flexion and extension. Naffziger[17] states that 'when the spine is flexed the nuc'eus pulposus in the lumbar region migrates dorsally and if rotation should accompany flexion, the annulus is further subjected to torsional stresses.[1]

In view of the free active rotation that takes place in the thoracic vertebrae, it would seem to be a reversal of simple engineering principles if the rotary element ceased suddenly at the transition point of the thoracic and lumbar spines. Active rotation is certainly confined to the thoracic region since the paired rotatores confine their action to those vertebrae. The X-rays (Fig. 4) demonstrate

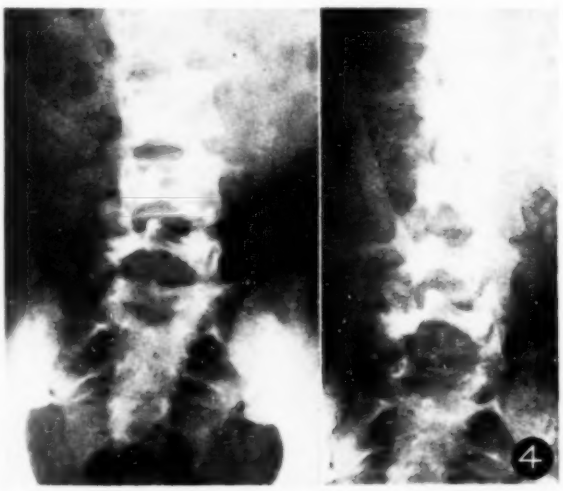

Fig. 4. X-rays of lumbar vertebrae showing flexion and rotation.

that passive rotation occurs almost as fully with the lumbar spine in flexion as it does in extension. The technique was similar to that employed with the earlier films; the patient's pelvis was fixed so that minimal flexion could take place at the hip joints, the lumbar spine was then passively flexed and rotated. Despite distortion due to lumbar spine flexion, rotation is apparent. Appreciation of the torsional potentialities of the lumbar components suggests the relationship of the lumbar

vertebrae and intervertebral discs to the torsional forces that they have to absorb and distribute. The mechanism of the lumbar spine is designed to withstand these forces in the same manner as a torsion bar mediates torsional thrusts and, for practical and clinical purposes, this portion of the spine may be regarded as a type of torsion bar.

The lumbar disc throughout its functional life is constantly subjected to a force of compression and this continues to act even when the body is supine and the disc is relieved of the weight of the load above it.

This force is increased by the movements of extension, flexion and rotation. During the first 2 movements the nucleus migrates anteriorly or posteriorly depending on the inclination and relationship of the adjacent surfaces of the vertebrae containing the disc. Should rotation take place during either of these two movements the further compression force of torsion is superadded, and increased stress has to be sustained by the already heavily loaded fibres of the annulus. Moreover, the 'shear' force acting on the vertebral body tends to rotate the vertebrae causing a compression moment of this upon the next lower disc.[18]

It would seem, therefore, that torque acting either alone or with active extension and flexion of the lumbar vertebrae may be implicated as a traumatic factor. Whether this form of trauma is primary in its effect on the integrity of the annulus or whether it is a substantial component of the total mechanism of injury, is difficult to compute.

However, if these mechanics of injury are accepted then, increasing the traumatic torque (i.e. the torsional force that has produced injury) will exaggerate pain and disability, the undermentioned clinical signs become understandable and also the principle may be applied in treatment.

Where the diagnosis of lumbar disc herniation has been made, the following two clinical signs should be elicited:

1. The patient lies supine and the manoeuvre described earlier in this paper as the 'pelvic twist' is performed gently, but with as full a range as the patient's pain permits.

It will be found that rotation of the pelvis with the homolateral shoulder fixed is invariably more painful to the one side than to the other. The direction of the movement causing pain is noted, e.g., right hip rotated to left with right shoulder fixed to the couch, more painful than vice versa.

2. The patient is now put into the prone position and asked to relax as much as possible. Strong lateral pressure is applied by the thumb at right angles to the lumbar spinous processes on one side, commencing at L1 and working caudally. As the suspected level of herniation is approached, it will be found that intense discomfort and an increase in root pain (if present) will take place.

The opposite side now examined in an identical manner. It will be found that there is little or no intensification of the local or referred pain. The force directed at the sides of the spinous processes should be of a magnitude such as the examiner would use if he was attempting to elicit movement of the spinous process in the direction of the applied force.

If the two *signs* are co-ordinated it will be found that:

Sign 1. If the right hip rotated to the left with the right shoulder fixed produces pain, and vice versa is painless, then:

Sign 2. Pressure along the left sides of the spinous processes at the level of the herniation will produce pain, the spinous process immediately above the herniated disc being the most painful.[19]

It is important that this pain be differentiated from paraspinal tenderness. This is due to pressure on the bellies of the erectores spinae which are in reflex spasm following disc herniation. Pain produced by pressure on these muscles is of a more diffuse character and root pain is not increased.

It is postulated that pressure in the manner described on the sides of the spinous processes, produces a moment of torque upon the vertebrae which is in the same direction as the torque produced by the 'pelvic twist'. Torsional force in the opposite direction to the above, is known as 'counter torque' and is utilized in treatment.[20]

An important preliminary to treatment is the assessment of the direction of traumatic torque which should be done in the manner described. The patient is then suspended in counter-torque, i.e., thorax and pelvis are twisted in the direction opposite to that found in Sign 1, and it will be found that if in Sign 2 the spinous process at the level of the injured disc was painful from left to right, counter-torque exerts its force on the same spinous process from right to left. Detailed instructions for this manoeuvre have been described in an earlier paper.

Counter-torque suspension is a simple manoeuvre which can be carried out in any Department of Physical Medicine where suspension of the Guthrie Smith type is available.

An improved type of table has been designed (Fig. 5). This consists of a tilting table with a compensation device which permits the axis of rotation of the patient's spine to remain in the same longitudinal axis as the centre around which tilting takes place. The patient is placed in the position of counter-torque suspension as previously described. This form or table allows the shoulders to be tilted and fixed at a convenient angle, while traction of some 200 lb. in the long axis of the spine, is applied to the pelvis as it inclines to the opposite plane of the shoulders.

It will be noted that under these mechanical conditions the resultant of tension and torque acts on the lumbar spine (i.e. the resultant of an extension force and a rotational force).

This form of therapy may be used for both acute and chronic lumbar disc herniation. Acute disc herniations are treated twice daily until there is a remission of symptoms and thereafter daily until symptom free. Chronic disc herniations are treated once daily until symptom free. Upon cessation of treatment, counter-torque and extension exercises are advised and the patient is fitted with a short brace. This is worn for a period of two months.

RESULTS OF TREATMENT

Sixty-nine patients were treated by the simple counter-torque suspension method. None of these patients underwent myelography, and lumbar disc herniation was diagnosed on the history and clinical findings and X-rays; 80% of patients treated were sufficiently relieved to permit

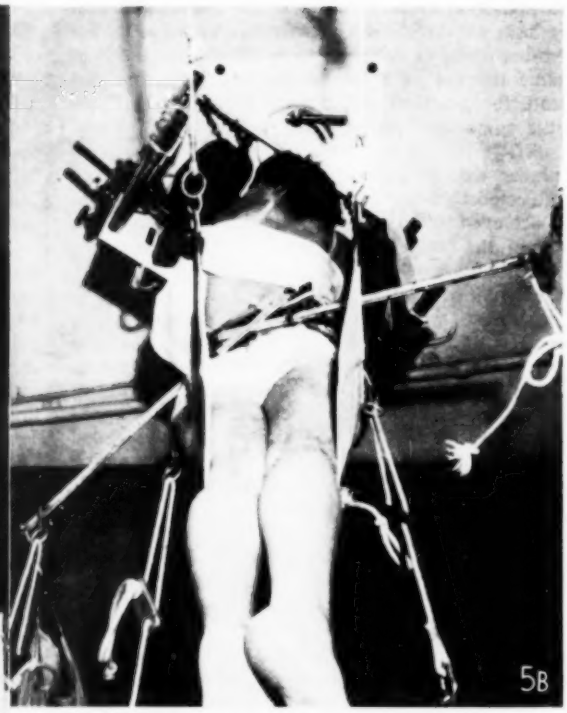

Fig. 5.A. Counter-torque traction table. The left shoulder is elevated and the left hip depressed, producing torsion on the lumbar vertebrae. The springs in the background are each 50 lb. and are exerting their pull on the pelvis.

Fig. 5. B. Posterior view of apparatus. Planes of shoulder and pelvis are seen in opposite obliquities. Attached to the end of the left crossbar of the pelvic belt is a bag containing suitably heavy weights.

their return to reasonable activity except in the case of heavy workers who were advised a change of occupation where possible or alternatively 3 months of light duty; 6% were advised laminectomy and are now symptom free.

It should be emphasized that this is a simple and conservative method of treating an acute or chronic disc episode.

With any form of conservative treatment, recurrence of symptoms is possible, but it has been found that the results achieved by counter-torque suspension are superior to those produced by any other form of conservative treatment.

SUMMARY

1. The effect of torque on the causation of lumbar disc herniations is discussed.

2. Attention is drawn to the range of rotation that exists in the lumbar spine.

3. Traumatic torque is elucidated and two signs for the recognition of its direction are described.

4. A method of conservative and ambulant treatment known as 'counter-torque suspension' is described.

5. A traction table embodying these principles is described.

I wish to thank Mr. Arthur J. Helfet, M.Ch. (Orth.), F.R.C.S. (Eng.) of the Department of Orthopaedic Research, University of Cape Town for his co-operation, and for permission to publish this paper. I also wish to thank Mr. Joseph Newman and Mr. John Menhenick of Sam Newman Limited, Paarden Eiland, C.P., who constructed the torque-traction table from my design.

REFERENCES

1. Armstrong, J. R. (1952): *Lumbar Disc Lesions.* Edinburgh and London: E. & S. Livingstone Ltd.
2. Ellis, John D. (1940): *The injured back and its treatment.* Springfield, Illinois: Charles C. Thomas.
3. Mennel, James B. (1945): *Physical Treatment by Movement, Manipulation and Massage.* London: J. & A. Churchill Ltd.
4. Fisher, Timbrell, A. G. (1944): *Treatment by Manipulation.* 4th ed. London: H. K. Lewis & Co., Ltd.
5. Marlin, T. (1934): *Manipulative Treatment for the General Practitioner.* London: Edward Arnold & Co.
6. Cyriax, James (1950): Brit. Med. J., **2**, 1434.
7. Gray, (1938): *Anatomy*, 27th ed., London: Longmans, Green & Co.
8. Frazer, Ernest J. (1933): *The Anatomy of the Human Skeleton.* London: J. & A. Churchill Ltd.
9. Buchanan (1950): *Manual of Anatomy*, 8th ed., London: Baillière, Tindall & Cox.
10. Abbott, E. G. (1913): *Movements and positions of the normal spine and their relations to lateral curvature.* Am. J. of Orthp. Surg., **11**, 13.
11. Brailsford, James H. (1935): *The Radiology of Bones and Joints.* Oxford University Press.
12. Blair, D. M. (1937): In *Cunningham's Text Book of Anatomy.* Oxford University Press.
13. Ellis, John D. (1940): *Op. cit.*
14. Cotton, Henry (1948): London Country Life.
15. Blair, D. M. (1937): *Op. cit.*
16. Spurling, R. G. and Bradford, F. (1939): J. Amer. Med. Assoc., **113**, 2019.
17. Naffziger, *et al.* (1938): Surg. Gynec. and Obst., **66**, 288.
18. Thieme, Frederick P. (1950): *Lumbar Breakdown Caused by Erect Posture. Anthropological Papers*, no 4. University of Michigan Press.
19. Coplans, Carl W. (1951): S. Afr. Med. J., **25**, 88.
20. Coplans, Carl W. (1951): *Ibid.*

APPENDICECTOMY

A SURVEY OF 200 CASES

W. SILBER, M.B., Ch.B. (CAPE TOWN) *

Groote Schuur Hospital, Observatory, C.P. and Department of Surgery, University of Cape Town

During the past few years it would appear that an increasing number of appendicectomies was being performed at Groote Schuur Hospital, but these cases have never been subjected to analysis.

It was therefore decided to have all the appendices removed during 1952 examined histologically with a view to correlating the preoperative and pathological diagnoses.

This analysis of 200 appendicectomies is the number operated on in one surgical firm at Groote Schuur Hospital during 11 months. It formed 22% of the total number of admissions to this firm during this period.

INVESTIGATION OF THESE CASES

ACUTE APPENDICITIS

All these cases were investigated clinically in great detail and only operated on where there was some convincing proof of the diagnosis.

Besides a full history and thorough clinical examination, all had full urine and blood investigations.

Only with a convincing history, suggestive examination and corroborative laboratory findings were these cases subjected to surgery. Otherwise they were observed and sent home if the symptoms and signs disappeared.

CHRONIC APPENDICITIS

Most of these were booked in from our Surgical Out-Patient Department where an attempt was made to screen them carefully, particularly in view of the critical bed position.

The majority of these were also subject to constipation; these were treated with a magnesium sulphate and a belladonna mixture, often with very good results as far as the pain and constipation were concerned. If the pain persisted, however, with tenderness in the right lower quadrant in spite of the mixture and the genito-urinary, gynaecological and general investigations were negative, they were admitted for appendicectomy.

A follow-up questionaire was sent to all the patients with normal appendices histologically, requesting information about the alleviation of the right lower quadrant pain, but unfortunately too few have as yet replied to draw conclusions.

SURVEY OF CASES

The cases presented have been classified into the following categories:

Group A: Diagnosis of acute appendicitis confirmed histologically.

Group B: Diagnosis of acute appendicitis not confirmed histologically.

Group C: Diagnosis of chronic appendicitis confirmed and unconfirmed histologically.

GROUP A

TABLE I: INCIDENCE OF CONFIRMED ACUTE INFLAMMATION BY AGE, SEX AND RACE

Age Group in Years	*European*		*Coloured*		*Native*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
10—20 ..	7	1	6	3	1	0
21—30 ..	3	3	6	4	1	0
31—40 ..	3	2	1	1	3	0
41—50 ..	3	2	3	1	0	0
51—60 ..	1	1	1	2	0	0
61—70 ..	0	0	1	0	0	0
Total ..	17	9	18	11	5	0

* Senior Surgical Officer.

TABLE 2: ANALYSIS OF APPENDICULAR PATHOLOGY IN GROUP A

Type of Histology	*Europeans*	*Coloured*	*Native*	*Total*
Acute suppurative appendicitis	14	11	2	27
Acute phlegmonous appendicitis.. ..	3	3	2	8
Acute gangrenous appendicitis	2	0	0	2
Acute inflammation..	5	8	0	13
Acute inflammation: with mass	0	2	0	2
with generalized peritonitis	2	4	1	7
Tuberculous infection	0	1	0	1

COMMENT

Number. This group of cases of histologically proved acute appendicitis, totalled 60, i.e. 30% of the total number of appendicectomies and 56% of those diagnosed as acute appendicitis pre-operatively.

Sex and Age (Table 1). Considering the group as a whole, it would appear that males definitely predominate in a ratio 39 : 20 and that the majority of the cases occurs in the age groups 10-20 and 21-30 years in Europeans and Coloured, with very few in Natives.

There were 15 cases diagnosed as acute appendicitis proved histologically over the age of 40 years, i.e. 25% of this group.

Pathology and Duration of Illness (Table 2). Acute suppurative appendicitis seems to be the commonest type of pathology (27 cases) with an average duration of illness before admission to hospital of 1 day.

Signs of acute inflammation were found in 13 cases with an average duration of illness of 3 days.

The acute phlegmonous (8 cases) and gangrenous (2 cases) appendicitis had an average duration of illness of 1 day each and the group acute inflammation with local mass formation (2 cases) or with generalized peritonitis (7 cases) had an average of 3 days' illness.

The case of tuberculous infection (a Coloured female aged 22 years), who presented as an acute appendicitis, had been ill for 14 days. (The appendix, which was obviously inflamed, was removed for biopsy—later, after P.A.S., Streptomycin and Rimifon had seemed to have no effect, a right hemicolectomy was performed).

Three of the above cases were on the waiting list diagnosed as chronic appendicitis, but developed acute symptoms which were proved to be due to acute appendicitis histologically.

The average stay of Group A in hospital was 12 days.

COMMENT

Number. This group of cases diagnosed as acute appendicitis preoperatively, but not confirmed histologically, totalled 47 cases, i.e. 23.5% of the total number of appendicectomies performed and 43.9% of those diagnosed as acute appendicitis preoperatively.

Sex and Age (Table 3). In this group females predominate in a ratio of 30:17, again with the largest number of cases appearing in the age groups 10-20 and 21-30 years in both European and Coloured—Natives again few in numbers.

GROUP B

TABLE 3: INCIDENCE OF UNCONFIRMED INFLAMMATION BY AGE, SEX AND RACE

Age Group in Years	*European*		*Coloured*		*Native*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
10—20 ..	5	15	2	3	0	0
21—30 ..	2	1	0	3	1	0
31—40 ..	2	3	1	1	0	0
41—50 ..	4	0	0	1	0	0
51—60 ..	0	1	0	1	0	0
61—70 ..	0	1	0	0	0	0
Total ..	13	21	3	9	1	0

TABLE 4: ANALYSIS OF APPENDICULAR PATHOLOGY IN GROUP B

Type of Histology	*Europeans*	*Coloured*	*Natives*	*Total*
No pathology evident	23	12	1	36
Submucosal fibrosis..	4	0	0	4
Distal end fibrosis ..	3	0	0	3
Whole wall fibrosis ..	1	0	0	1
Submucosal eosinophilic infiltration ..	1	0	0	1
Lumen containing suppurative material ..	1	0	0	1
Lymphoid hyperplasia	1	0	0	1

TABLE 5: ANALYSIS OF OTHER PATHOLOGY FOUND IN GROUP B

Type of Pathology	*Europeans*		*Coloured*		*Natives*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
Catarrhal jaundice	0	1	0	0	0	0
Gastroenteritis	1	0	0	0	0	0
Meckel's diverticulum ..	2	0	0	0	0	0
Mesenteric adenitis ..	2	0	0	0	0	0
Ovarian cyst ..	0	1	0	0	0	0
Ovarian tumour	0	0	0	1	0	0
Pancreatitis—acute.. ..	0	1	0	0	0	0
Pyelitis ..	0	0	0	0	0	1
Salpingitis ..	0	1	0	2	0	0

Pathology (Table 4). Of the total 47 cases, 36 were found to be normal histologically, i.e. 33.6% of the total number of cases diagnosed as acute appendicitis preoperatively.

In the remaining 11 cases minor degrees of pathology were found, in none definite signs of acute inflammation and it is questionable whether these were definitely the cause of the pain.

There was only one case of lymphoid hyperplasia in a male and one case in which the lumen was filled with suppurative material but with no change in the wall itself.

Other Pathology (Table 5). In this Group B, however, 13 cases presented other pathology, some of which could have been responsible for the pain in the umbilical and right iliac fossa regions.

Both Meckel's diverticuli were, however, normal histologically. In one male it was discovered after the operation that the whole family had gastroenteritis, the patient developing the latter a day later.

The female who later developed catarrhal jaundice had no symptoms or signs of the latter at the time, but became jaundiced the following day.

Three cases had salpingitis and there was no doubt that this was the cause of the patients' symptomatology.

Two males who presented as acute appendicitis (age 10 and 12 years) were shown, at operation, to have mesenteric adenitis only.

The case of pancreatitis was proved at operation—normal appendix but definite fat necrosis in the omentum.

The only Native case operated on in this group developed signs of pyelitis a day after the operation, although the urine was clear preoperatively.

Two females presented with ovarian pathology both of which probably caused the right iliac fossa pain.

The average stay in hospital of Group B was 6 days.

GROUP C

TABLE 6: INCIDENCE OF DIAGNOSED CHRONIC APPENDICITIS BY AGE, SEX AND RACE

Age Group in Years	*Europeans*		*Coloured*		*Native*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
10—20 ..	9	18	5	12	0	1
21—30 ..	8	15	1	4	0	0
31—40 ..	4	4	2	3	0	0
41—50 ..	3	1	0	1	1	0
51—60 ..	0	1	0	0	0	0
Total ..	24	39	8	20	1	1

TABLE 7: ANALYSIS OF APPENDICULAR PATHOLOGY IN GROUP C

Type of Histology	*Europeans*	*Coloured*	*Natives*	*Total*
Normal appendix ..	47	26	2	75
Serosal and submucosal fibrous thickening	11	1	0	12
Atrophy of muscle coat	1	0	0	1
Eosinophilic infiltration	1	0	0	1
Carcinoid tumours ..	3	0	0	3
Trichiuris trichiura infestation	0	1	0	1

TABLE 8: ANALYSIS OF OTHER PATHOLOGY FOUND IN GROUP C

Type of Pathology	*Europeans*		*Coloured*		*Native*	
	Male	*Female*	*Male*	*Female*	*Male*	*Female*
Ascaris infestation of bowel	1	0	1	0	0	0
Fibroid uterus	0	1	0	0	0	0
Meckel's diverticulum ..	1	0	0	0	0	0
Ovarian cyst ..	0	1	0	0	0	0
Renal calculi ..	0	0	2	0	0	0
Salpingitis ..	0	1	0	4	0	0

COMMENT

Number. This group totalled 93 cases, i.e. 46.5% of the total number of appendicectomies performed.

Age and Sex (*Table 6*). Again in this group the females predominated in the ratio of 2 : 1 with a preponderance in age groups 10–20 and 21–30 years, and with a similar distribution to the racial groups of Group B.

Pathology (*Table 7*). In this group 75 of the 93 appendices examined were absolutely normal histologically. Twelve had fibrous thickening of serosa and subserosa designed chronic appendicitis. One showed atrophy of muscularis, 1 with eosinophilic infiltration and 1 with *Trichiuris trichiura* infestation.

It is interesting that in this group 3 carcinoid tumours of the tips of the appendices were found all in females aged 16, 18 and 31.

Other Pathology. In this group only 12 cases presented other pathology which could have been the cause of the symptomatology.

Five cases were proved to be salpingitis (1 European and 4 Coloured). Renal calculi were found in 2 Coloured males, 2 European females had gynaecological pathology, viz. fibroid uterus and ovarian cyst, and 2 males (European and Coloured) had ascaris infestation of the bowel.

One European male had a normal Meckel's diverticulum—a doubtful cause of his symptoms.

The average stay in hospital of Group C was 6 days.

Four Europeans had Cambie meals performed and in each a diagnosis of a pathological appendix was made, but in none was the appendix abnormal in any way.

TABLE 9: PROPORTION OF NORMAL HISTOLOGICAL APPENDICES REMOVED IN EACH GROUP

Group	*European*		*Coloured*		*Native*		%
	Male	*Female*	*Male*	*Female*	*Male*	*Female*	
A ..	0	0	0	0	0	0	0
B ..	8	15	3	9	1	0	76·6
C ..	18	29	9	17	2	0	80·6

POST-OPERATIVE MORBIDITY IN WHOLE GROUP

1. *Acute Gastric Dilatation*: (1).
2. *Pulmonary Complications*:
   (a) Bronchitis (1).
   (b) Basal atalectasis (1).
   (c) Pulmonary emboli (2). (Both associated with acute suppurative appendicitis.)
3. *Infections*:
   (a) Wound haematomata (3).
   (b) Pelvic abscess (1).

MORTALITY

There was one death—a case of acute suppurative appendicitis who developed pyaemic liver and cerebral abscesses.

CONCLUSIONS

The incidence of confirmed acute appendicitis is higher in males than in females.

Nevertheless, a much larger number of operations is performed in females with the preoperative diagnosis of

acute appendicitis than in males with a ratio of 30 : 17 in Group B.

The diagnosis was proved correct in 37.4% of males but in only 18.7% of females; 76.6% of the total in Group B were normal.

Hence it is most important, in females especially, to exclude all other pathology before making the diagnosis of acute appendicitis, especially in the younger age groups—where the pain may well be due to the onset of ovulation with rupture of the Graafian follicles—provided it is realized that even with very adequate investigation normal appendices may still be removed.

The other very important group is that of the so-called chronic appendicitis. Of a total of 93 cases only 19.4% showed any histological abnormality and in 12.9% other pathology was present. It is striking to note that in 67.7% of this group no pathology could be found to account for the patients' symptoms.

In this group, too, females predominated both in the number of operations performed and in the number of normal appendices removed.

Thus it is here again most important to investigate all these cases thoroughly before subjecting them to appendicectomy, with the same proviso stated in the acute cases (Group B).

Further study of the aetiology of chronic right lower quadrant pain is definitely indicated.

SUMMARY

Two hundred unselected cases of appendicectomy are analysed with regard to age groups, sex, racial incidence and the preoperative and histological diagnoses.

A high percentage of these cases was found to have normal appendices histologically.

It is stressed that full investigation in cases of suspected acute or chronic appendicitis is essential before operating, but that even then the correct preoperative diagnosis may be extremely difficult and in many cases the symptomatology remains unexplained.

My thanks are due to Mr. G. Sacks, for his continual enthusiastic help and encouragement; to Professor Thompson and the staff of the Department of Pathology for willingly undertaking all the histological investigations; to Dr. Cloete, Acting Superintendent, Groote Schuur Hospital, for allowing publication of this article, and to Miss Webster for typing the MS.

NEW PREPARATIONS AND APPLIANCES

PENTRESAMIDE AND PENTRESAMIDE 250

Formula: Each slotted 'Pentresamide' Tablet contains:

Sulphamerazine	0.1 gm.
Sulphadiazine	0.2 gm.
Sulphamethazine	0.2 gm.
Potassium Penicillin	100,000 units.

Each slotted 'Pentresamide 250' Tablet contains:

Sulphamerazine	0.1 gm.
Sulphadiazine	0.2 gm.
Sulphamethazine	0.2 gm.
Potassium Penicillin	250,000 units.

Properties: Addition of penicillin to the 3 sulphonamides results in some instances in potentiation of the antibacterial effect as compared to administration of the antibiotic or sulphonamide alone.

Concurrent administration of penicillin and sulphonamides minimizes the danger of the development of bacterial resistance.

There is no increase in the incidence of sensitivity or toxic reactions following combined dosage of penicillin and sulphonamides.

Administration: 'Pentresamide' and 'Pentresamide 250' should be administered not less than ½ to 1 hour before eating.

Dosage: According to the desired dosage of penicillin required either 'Pentresamide' or 'Pentresamide 250' may be used as follows:

Infants up to 6 months: Initial dose 1½ tablets followed by ½ tablet every 6 hours.

Infants ½ to 3 years: Initial dose 3 tablets followed by 1 tablet every 6 hours.

Children 3 to 10 years: Initial dose 6 tablets followed by 2 tablets every 6 hours.

Adults: Initial dose 6 tablets followed by 2 tablets every 4 hours.

Caution: As regards fluid intake, the usual precautions observed in sulphonamide therapy should be employed, particularly in infants and older patients.

Literature is available on request through the S.A. Technical Representative, Sharp & Dohme, P.O. Box 5933, Johannesburg.

PENALEV (SOLUBLE PENICILLIN TABLETS)

Formula: 'Penalev' represents a stable, pure soluble form of penicillin in tablets that are free from all flavouring, excipients and binders.

Properties: 'Penalev' Tablets are designed for oral administration of penicillin to infants, children and adults. They may be used alone or as a follow up dosage from after an initial dose of injectable penicillin. Adequate dosage produces satisfactory penicillin blood levels.

'Penalev' Tablets dissolve readily in milk formulas, prune and carrot juices, water or salt solution.

'Penalev' Tablets may be used for sublingual administration.

'Penalev' Tablets can be used for compounding and the penicillin retains its activity for the life of the average prescription (8–15 days), provided the mixture is kept refrigerated during use.

Dosage: Average dosage in infants and children is 100,000 units every 3 or 4 hours. The initial dose may be 500,000 units and in severe infections 500,000 units may be given every 4 hours.

Caution: 'Penalev' Tablets are completely stable at room temperatures. When added to prune and carrot juices and infants' formula, do not allow to stand—administer immediately. Add to infants' milk formulas after sterilization and cooling. When added to a prescription the bottle should carry a *Keep in Refrigerator* label. Stored in this manner the full penicillin activity is maintained for 7 to 15 days—the life of the average prescription.

Literature is available on request from the S.A. Technical Representative, Sharp & Dohme, P.O. Box 5933, Johannesburg.

* * * *

VERILOID* IN HYPERTENSION

Veriloid* is a purified alkaloidal extract fractionated from *Veratrum viride* by an exclusive Riker process. It consists of only the most desirable hypotensive principles of the crude drug and on a weight basis represents less than 1% of the whole plant from which it is derived.

Veriloid reduces the blood pressure by a neural vasorelaxant

* Trade Mark of Riker Laboratories, Inc.

action,[1] independent of any motor vagus effect. It may actually increase cardiac output, an action of special benefit among patients with hypertensive cardiac failure. Desirable features of Veriloid are that it produces no compromise of renal function[2]; that cerebral blood flow is not decreased[3]; and, since it is not an adrenergic blocking agent and exerts no sympatholytic effect, Veriloid neither interferes with postural adaptation, nor causes tachycardia.

Veriloid is assayed physiologically in mammals,[4] with drop in blood pressure as the end point. Hence biological activity is expressed directly in terms of the clinically significant vasodepressor action.

Since Veriloid is standardized on a milligramme basis, the constancy of its pharmacological action permits an exactitude in dosage. Such critical control permits long-term treatment without incapacitating the patient by drastic pressure fluctuations in a vascular system already adapted to high pressure levels.[5, 6]

Veriloid has been termed the most effective hypotensive agent available to-day.[6, 7] The therapeutic ratio of Veriloid is relatively high, and long-continued use is possible because development of idiosyncrasy or tolerance is very unusual.[6, 8, 11]

Veriloid produces a prompt and sustained drop in blood pressure in all forms of hypertension. Its administration reduces the incidence of hypertensive headache and improves renal function and the sensorium.[6]

In one series of patients with essential hypertension, Veriloid produced striking improvement in 80%.[6] In severe diastolic hypertension—such as pre-uraemic malignant hypertension and hypertensive encephalopathy—it controlled the blood pressure and produced a gratifying beneficial effect even after the failure of other hypotensive drugs.[7, 10] Veriloid has been found to control neurogenic hypertension even after refractoriness to ganglionic blocking agents had developed.[9] The chief side effects, in the order of appearance, are epigastric burning, salivation, nausea and/or vomiting. Such side actions are valuable indicators of dosage limits. They are readily overcome by a slight decrease in the daily dosage.

Dosage: The usual daily requirement for Veriloid is 9 to 15 mg., given in divided dosage 3 times daily, every 6 to 8 hours, preferably after meals. The evening dose may be 1 or 2 mg. larger than the other 2 doses of the day. No deleterious effects have been seen from long-term administration.

Veriloid is available from all wholesale and retail chemists in the following forms:

Veriloid (plain) in 2 mg. tablets.

Veriloid-VP (Veriloid 2 mg., phenobarbital, 15 mg.)

Veriloid Intravenous Solution (boxes of 6 ampoules each of 5 c.c. containing 0.4 mg. Veriloid per c.c.).

REFERENCES

1. Swiss, E. D. and Maison, G. L. (1952): J. Pharmacol. Exper. Therap., **105,** 87.
2. Goldman, R. *et al.* Amer. J. Med., in the press.
3. Moyer, J. H. *et al.* To be published.
4. Maison, G. L., Gotz, E. and Stutzman, J. W.: (a) Federation Proc., **9,** 299, 1950; (b) Arch. Internat. Pharmacodyn., **85,** 357, 1951; (c) J. Pharmacol. Exper. Therap., **103,** 74, 1951.
5. Stutzman, J. W., Maison, G. L. and Kusserow, G. W. (1949): Proc. Soc. Exper. Biol. Med., **71,** 725.
6. Wilkins, R. W. (a) New Eng. J. Med., **242,** 535, 1950; (b) **20,** 89, 1951.
7. Freis, E. D. (1951): M. Ann. District of Columbia, **20,** 297.
8. Gropper, A. L., Surtshin, A. and Hedrick, J. T. (1951): A.M.A. Arch. Int. Med., **87,** 789.
9. Yonkman, F. F. (1951): J. Michigan M. Soc., **50,** 160.
10. Stearns, N. S. and Ellis, L. B. (1952): New Eng. J. Med., **246,** 397.
11. Hafkenschiel, J. H. *et al* (1952): Penn. Med. J., **55,** 120.

IN MEMORIAM

MAURICE HUMPHREY WOSTENHOLM, M.A. CAMB., F.R.C.S.

Mr. M. H. Wostenholm, Ear, Nose and Throat Surgeon of the Bedford General Hospital, died with his wife in a motor car accident on 12 December 1952.

Maurice Wostenholm was born in Cathcart and studied medicine at Cambridge and at the London Hospital from which he qualified in 1941. After several appointments at this hospital and serving as a graded surgeon in the R.A.M.C., he took his F.R.C.S. in 1948. Eighteen months ago he was appointed as Regional Ear, Nose and Throat Surgeon to the Bedford and St. Alban's Hospitals.

He was a kindly, conscientious and able surgeon with a broad approach to his specialty. His loss will be felt deeply by his colleagues in England and by those who knew him in South Africa.

Mr. and Mrs. Wostenholm are survived by 3 sons. Our sympathy goes to the bereaved relatives.

IN PASSING

CAPE TOWN PAEDIATRIC GROUP

The next meeting will be held on Friday, 6 March, at Groote Schuur Hospital, in the E4 Lecture Theatre.

Subject: The Place of the Paediatrician in the Maternity Unit.

Speaker: Prof. James T. Louw.

All practitioners are welcome.

CORRESPONDENCE

REGISTRATION OF SPECIALITIES: AMENDED RULES

To the Editor: I am desired by the Specialists' Committee of my Council to forward to you a copy of the amended rules for the registration of specialities which are now operative, and to request your assistance in bringing these to the notice of the profession. A copy of the new rules is appended hereto.

I am furthermore to say that, in order to provide for persons who commenced training in their specialities prior to the promulgation of these amended rules, the Council has resolved that the Specialists' Committee may deal with their applications under the rules which were previously operative, and if applicants have complied with those rules, their specialities may be registered. This concession will continue to operate until 1 January 1957, and thereafter will be withdrawn.

Copies of the new rules, and the rules which were previously operative, as also copies of the Council's list of teaching and approved hospitals in the Union and Great Britain, may be obtained from Council's offices. May I also add that the Council's Specialists' Committee will be pleased to assist any medical practitioner who may have difficulty in the interpretation of the rules.

Your assistance and courtesy in bringing the above to the attention of the profession will be highly appreciated.

W. H. Barnard
Assistant Registrar

The South African Medical and Dental Council
P.O. Box 205
Pretoria
2 February 1953

[The amended rules are printed on p. 192.—*Editor.*]

AMENDED RULES

THE SOUTH AFRICAN MEDICAL AND DENTAL COUNCIL.—RULES REGARDING THE FORMS TO BE FILLED IN AND DOCUMENTS TO BE SUBMITTED BY APPLICANTS FOR REGISTRATION OR RESTORATION TO THE REGISTERS

The Minister of Health, in exercise of the powers conferred on him by sub-section (4) of section *ninety-four* of the Medical, Dental and Pharmacy Act, 1928 (Act No. 13 of 1928), as amended, has approved of the further amendment of the rules made by the South African Medical and Dental Council under sub-section (2) of the said section and published under Government Notice No. 2198 of 1930, as amended, by the substitution—

(1) for the existing rule (8) of the following:

'8. A medical practitioner who desires to have the name of his speciality inserted in the register shall be required—

(a) to hold a higher qualification in the form of a degree or diploma related to the speciality concerned, obtained after examination and acceptable for this purpose to the Council[1];

(b) to submit proof to the Council that a period of at least six years has elapsed after obtaining a qualification which entitled him to registration as a medical practitioner or a "resident medical officer" in terms of the regulations framed under the provisions of section *twenty-two* of the Act (as amended), or as an Intern in terms of the regulation framed under the provisions of section *twenty-five* of the Act (as amended);

Note.—The year which a practitioner served as a "resident medical officer" or an Intern may be one of the six years referred to above.

(c) to submit proof to the Council that, subsequent to having registered as a medical practitioner, he has spent at least two years in general practice or in lieu thereof has obtained such other experience as the Council may from time to time determine;

Notes.

(i) It is desirable that this experience be obtained before the clinical experience in the relevant speciality prescribed in paragraph (d) hereunder;

(ii) in the case of persons undertaking training in lieu of general practice in terms of paragraph (c) above, at least one year's experience must be obtained in general medicine and/or general surgery.

(d) to satisfy the following additional specific requirements in the speciality which he wishes to have registered against his name:

(i) *Medicine; Surgery; Obstetrics and Gynaecology; Anaesthetics; Dermatology; Neurology; Neuro-Surgery; Ophthalmology; Orthopaedics; Otorhinolaryngology; Pediatrics; Physical Medicine; Plastic and Maxillo-facial Surgery; Psychiatry; Radiology; Radiological Diagnosis; Radiological Therapy; Thoracic Surgery; Urology; Venereology.*—That he has had three years' satisfactory clinical experience as the holder of a clinical appointment under the control of the department in a teaching hospital.

(ii) *Pathology.*—That he has had four years' satisfactory experience in a teaching institution or university recognized by the Council in all the subjects of general pathology.

Notes.

(1) Experience at a hospital or institution of less than three months' duration will not be regarded as satisfactory experience as prescribed in the rules.

(2) If a practitioner has had two years' satisfactory experience in his speciality in an approved hospital or institution, he may be given a maximum credit of twelve months' specialistic training (or if less than two years' experience, but not less than six months' experience, a proportionate exemption, provided that the total exemption does not exceed twelve months).

(3) Credit may be given for general practice depending on the quality and type of general practice done, provided such practice was done for a period of at least eight years. (This note is not applicable to the speciality pathology.)

(4) Where a medical practitioner wishes to specialize in both dermatology and venereology, the periods specified under the rule prescribing clinical specialistic experience in dermatology and venereology each become two years making a total of four years; provided that the total period spent in a teaching hospital shall not be less than three years.

(5) Where a medical practitioner wishes to specialize in both neurology and psychiatry the periods specified under the rule prescribing clinical specialistic experience in neurology and psychiatry each become two years, making a total of four years.

(6) In the speciality Psychiatry clinical experience in terms of the above rules shall include a minimum of one years' experience in an approved mental hospital.';

(2) for the existing rule 11 of the following:

'11. (i) A medical practitioner may have the name of his speciality removed at his request from the register of medical practitioners with the permission of the Council and thereafter the practitioner shall revert to general practice;

(ii) A dentist may have the name of his speciality removed at his request from the register of dentists with the permission of the Council, on his having given the Council notice of at least 12 months of his intention to apply for such deletion, and thereafter the practitioner shall revert to general practice.

THE SICK AFRICAN : SECOND EDITION

To the Editor: In view of the fact that the Stewart Printing and Publishing Co., Cape Town, are no longer publishers of the above-mentioned book, practitioners and students may experience difficulty in obtaining copies of the book.

It would be much appreciated, therefore, if your readers could be informed that we have now purchased the stocks and rights in the present and all future editions of this title.

Although no new edition is likely to be published for some time, we now hold all the stocks of the present edition and all orders placed with us or through any bookseller will receive our immediate attention.

The price of the book remains at 38s.

P.O. Box 30
Juta & Co., Ltd.
Cape Town
3 February 1953

J. Douglas Duncan
Managing Director

RAILWAY SICK FUND : REMUNERATION FOR ANAESTHETICS

To the Editor: In your issue of 7 February appears an advertisement from the Railway Sick Fund offering a salary of £1,269 per annum for the part-time post of Anaesthetist at Port Elizabeth.

Applications are invited from both specialists and general practitioners.

I understand that approximately 1,000 anaesthetics a year are given to Railway patients in that district, and until now each anaesthetic has been paid for at the flat rate of 2 guineas a case.

Even at that rate the remuneration was considerably less than that advocated by Federal Council in September 1952, which suggested that anaesthetists should be paid by Benefit Societies according to the tariff for Medical Aid Societies, where the minimum fee is 3 guineas.

I am informed that the salary offered is calculated on a basis of 3s. 6d. per member per annum. The South African Society of Anaesthetists, whilst agreeing strongly with the recommendation of Federal Council that such work should be paid according to the Medical Aid Tariff, has suggested that where a closed panel is necessary an anaesthetist should be paid a salary at a rate of 7s. 3d. per member per annum.

Whichever way one calculates this offered salary it appears to be only half what it should be, and I trust that by a complete boycott of this proposed appointment as now advertised, the medical profession will give the Railway Sick Fund cause to reconsider its terms.

F. W. Roberts,
Honorary Secretary and Treasurer, South African Society of Anaesthetists.

309 Harley Chambers,
Jeppe Street,
Johannesburg.
15 February 1953.

Instructions to Authors

All authors are advised to consult *Medical Writing*, by Dr. M. Fishbein, formerly Editor of the *Journal of the American Medical Association*. The volume is obtainable from medical libraries in South Africa. It is published by the Blakiston Co., Philadelphia, U.S.A.

Papers submitted for publication in this *Journal* are accepted on condition that they have not been published elsewhere. The *Journal* Management reserves the copyright of all material published.

Considerable delay in the publication of papers is often due to the fact that they are poorly prepared. Publication will be expedited if the following specifications are complied with:—

1. All copy should be typewritten (double or preferably triple spaced) with wide margins.

2. Tables, references, graphs, illustrations and legends for illustrations should be clearly identified and *prepared on separate sheets*.

3. All photographs should be glossy prints unmounted, untrimmed and unmarked. Authors' suggestions for trimming, etc., are most suitably indicated on a duplicate print or diagram.

4. In no circumstances should original X-ray films be forwarded. Glossy prints must be submitted.

5. Line drawings should be on white board, arranged to conserve vertical space. All lettering in diagrams and graphs should be indicated clearly in soft lead pencil, preferably on a duplicate specimen or diagram in rough. In no circumstances should lettering be inked in or typewritten on the figure or the graph. Illustrations should not exceed 12 inches × 18 inches in size.

6. Figure numbers should be marked clearly on the back of each illustration, and in every case the top of the illustration should be indicated.

7. A limited but reasonable amount of illustrative and tabular matter is allowed free. Additional material of this sort may be allowed at cost, at the discretion of the Editor.

8. All references to the literature should be inserted in the text as a superior number and listed at the end of the article in numerical order.

9. References must conform to the following convention (journal titles being abbreviated according to the *World List of Scientific Periodicals*):—

White, J. and Brown, A. B. (1946): Arch. Clin. Med., **123**, 167.

Books should be cited as follows:—

Smith, J. (1946): *An Introduction to Medicine*, 2nd ed., p. 174. Cape Town: John Black, Ltd.

10. All numerals to be printed as figures (i.e. *not* spelt out). *For 'one' or 'I' always follow copy.* All numerals *always* to be spelt out in full at the beginning of a sentence.

11. Cubic centimetre *as* c.c.; Cubic millimetre *as* c.mm.; 7.11.46 *as* 7 November 1946; 2nd *as* second; 10/6 *as* 10s. 6d.; Per cent. *as* %; 1" *as* 1 inch; B.P. 140/80 *as* Blood pressure, 140/80 mm. Hg.

12. Each paper should conclude with a summary (of about 200 words) intelligible apart from reference to the main text of the article.

13*a*. Galley proofs will be forwarded to the author in good time before publication date.

13*b*. Corrections, other than typographical errors, will be charged to the author. It is therefore most important that the MS. be submitted in its *final form*.

14. *Reprints:* An order blank for reprints, together with a price list, will be sent to the author as soon as his article reaches page-proof stage.

15. All manuscripts and correspondence should be addressed to:—The Editor, *The South African Medical Journal*, P.O. Box 643, Cape Town.

The Medical Association of South Africa : Die Mediese Vereniging van Suid-Afrika

AGENCY DEPARTMENT : AGENTSKAP-AFDELING

KAAPSTAD : CAPE TOWN

Posbus 643, Telefoon 2-6177 : P.O. Box 643, Telephone 2-6177

PRAKTYKE TE KOOP : PRACTICES FOR SALE

(1016) Eastern Province. Unopposed solus practice. Average annual receipts £2,471. Premium for goodwill £750. Drugs, furniture and instruments offered at £190. Terms available. Attractive modern home to rent at £8 10s. p.m. Rental roomy surgery, £3 p.m.

(1177) Boland. Uitstekende praktyk binne 100 myl van Kaapstad. Twee aanstellings. Kontantontvangste ongeveer £5,000 per jaar. Premie verlang £2,500. Terme beskikbaar. Goeie vooruitsig vir uitbreiding as snywerk gedoen word. Huis te koop teen £3,500. Verband moontlik.

LOCUMS/ASSISTANTS AVAILABLE

(1212) From beginning March—preferably in Peninsula or environs.

(1238) Bilingual doctor, aged 26, single. Qualified London (St. George's) 1951. Available to act as assistant in general practice in Western Province.

ASSISTENTE/PLAASVERVANGERS VERLANG ASSISTANTS/LOCUMS REQUIRED

(1224) Cape Town, Southern Suburb. Assistant required with view to partnership.

(1186) Noordwes-Kaapland. Assistent so gou moontlik vir ses maande of langer. Salaris £75 per maand, plus vry huis of vry losies.

(1167) Namaqualand. 'n Afrikaansprekende assistent. Motorkar word voorsien. Goeie diensvoorwaardes.

(1158) Oostelike Provinsie. Vir Maart maand.

(1284) Western Province. From 16 April for approximately 3 weeks. Car provided, salary to be arranged.

(1285) Boland. Vanaf 20 Maart vir ongeveer 4 weke. £2 12s. 6d. per dag plus vry losies en kartoelaag. Verkieslik getroude man.

(1073) Klein-Karoo. Vanaf 11 Mei tot 11 Julie 1953. £2 10s. per dag, losies en motor- of motoronkoste word voorsien. Goeie geleentheid om snykundige ondervinding op te doen in 'n vennootskapspraktyk.

MICROSCOPE FOR SALE

(1291) Reickert—3 Objectives, x10, x60, x100 oil immersion. Mechanical stage. Abbé condenser. 3 Eyepieces, 4x, 10x, 16x. £50.

FOR IMMEDIATE SALE

(1294) Western Province hospital town. Excellent upper and middle class practice with scope for surgery. Average cash takings £5,000 p.a. Exceptionally low premium for immediate sale. Terms available. Details on application.

* * * *

JOHANNESBURG

Medical House, 5 Esselen Street. Telephone 44-9134-5, 44-0817
Mediese Huis, Esselenstraat 5. Telefone 44-9134-5, 44-0817

PRAKTYKE TE KOOP : PRACTICES FOR SALE

(Pr/S34) Progressive Transvaal dispensing practice. Average gross income £3,500 per annum. Excellent surgical facilities. Premium required £2,500 and the following terms could be arranged: £1,250 deposit and the balance over a period of 18 months, starting 3 months after the cash payment. The premium includes drugs, furniture and fittings, estimated at £800. Two transferable appointments worth £230 per annum.

(Pr/S54) Established branch practice in Johannesburg. Annual income £1,000. Premium required £500. Very much scope for expansion.

(Pr/S60) Prescribing practice in Southern Rhodesia. Monthly income approximately £500. Very modern hospital. Will suit doctor interested in surgery and midwifery. Premium required £5,000, and terms will be accepted.

(Pr/S63) Goedgevestigde Vrystaatse praktyk. Medisyne word aangemaak. Jaarlikse inkomste £2,400. Premie verlang is £1,000 en sluit voorraad medisyne en spreekkamermeubels in. Goeie kanse vir uitbreiding.

(Pr/S66) Uitstekende O.V.S. praktyk. Medisyne word aangemaak. D.G. aanstelling. Jaarlikse inkomste £3,400. Geen slegte skulde. Premie verlang is £1,250 en sluit voorraad medisyne en apteekmeubels in. Lieflike moderne woonhuis kan oorgeneem word teen slegs £3,350, waarvan £750 deposito sal wees en balans op verband.

(Pr/S69) Entirely cash non-European practice in Johannesburg. Average monthly income £100. Considerable scope for expansion. No reasonable offer will be refused. Rooms to be shared with dentist.

(Pr/S68) Well-established non-European dispensing practice. Annual income £1,800. Premium required is £1,200, and includes drugs, furniture and fittings. This practice will most definitely suit a woman doctor too.

(Pr/S70) O.F.S. hospital town. Very well-established practice. One appointment. Average annual income £3,600. This outstanding practice is for sale at only £1,500, payable as follows: £1,000 cash and balance over 15 months. A most delightful home is for sale at only £4,000 and a large bond could be raised.

(Pr/S71) O.F.S. hospital town. Monthly income of £225 of which £150 cash. Excellent scope for expansion. Will suit doctor interested in surgery. No reasonable offer will be refused.

(Pr/S72) Johannesburg—Northern Suburbs. Income of £1,000 per annum. Practice and house must be sold together and most liberal terms will be arranged.

(P/O15) O.F.S. country practice. Half share in general practice. Annual income £7,000 plus, showing a net income of £2,000 for each partner. Premium £2,250. Please apply for details.

(Pr/S16) Half share in general practice in Southern Rhodesia hospital town. Average net share of each partner £4,600 p.a. Appointments worth £2,700 p.a. Premium and house on terms.

(P/O17) Randse hospitaaldorp. Helfte aandeel in goedgevestigde praktyk, met sterk kraam neiging. Inkomste sal ongeveer £3,000 per jaar beloop. Premie verlang is £4,000 en terme kan gereël word.

(P/O18) Vennootskap op O.V.S. goudvelde. Groot mynaanstelling. Versekerde inkomste van ongeveer £1,400 per vennoot per jaar en sal definitief vermeerder sodra hospitaal voltooi is. Premie £1,800 en terme kan gereël word.

* * * *

DURBAN

112 Medical Centre, Field Street. Telephone 2-4049

PRACTICES FOR SALE : PRAKTYKE TE KOOP

(PD13) Natal Lower South Coast practice, near Pondoland border, suitable for retired doctor. Area developing and large Police holiday camp in vicinity. Excellent climate and very good fishing. Premium required £400, includes good stock of drugs and dressings, instruments and dispensary furniture. House for sale £1,800, including stand of one-third morgen. Bond available. For immediate sale. Owner having taken a full-time appointment.

(PD14) Non-European dispensing practice in rapidly expanding industrial and residential area, 11 miles from centre of coastal City. At present no night or after-hour calls, no week-end or surgical work undertaken. Practice could be improved if run on a full-time basis, otherwise ideal as a subsidiary

practice. Turnover for twelve months ended 31 June 1952 averaged £170 per month. Total expenses including car and travelling expenses £50 to £60 per month. Premium £750 including drugs, instruments and furniture.

(PD15) General practice established 1941 at pleasant residential and seaside resort about 10 miles south of Durban. Annual income approximately £1,000. No major surgery, minimum of minor surgery and only emergency midwifery being done at present. Brick house with consulting room attached, for sale at £5,250. Owing to ill health owner wishes to retire early in 1953. Premium £1,250 including drugs, surgery and dispensary furniture.

(PD18) Natal midlands. Excellent prospects in rapidly developing area. General mixed practice. Seller wishes to return to England. Premium £1,500 includes surgery furniture, fittings, instruments. Ideal climate and sporting facilities.

ASSISTENTE/PLAASVERVANGERS VERLANG
ASSISTANTS/LOCUMS REQUIRED

(128) Natal inland. From 23 February for two weeks. Mixed general practice with D.S. and R.M.O. appointment, £2 12s. 6d. per day, all found.

(129) Natal midlands. 16 February for three weeks. £2 12s. 6d. per day, all found. R.M.O. and two mine appointments, otherwise chiefly Native.

(131) East Griqualand. 15 April to 31 October. Partnership practice with one partner remaining in practice. Country general practice and major surgery is done. Full hospital facilities available. Salary £100 per month excluding car allowance. Locum must possess his own car.

(130) Natal midlands. Assistant required as soon as possible. Salary £90 per month if assistant uses own car. £75 per month if car is to be provided. Must have had experience of non-European patients. Hospital town. District surgeon appointment held but very little travelling and a minimum of night calls. Practice centralized at surgeries attached to principal's house.

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT: VACANCY

VICTORIA HOSPITAL, WYNBERG—MEDICAL PRACTITIONER, GRADE B

Applications are invited from suitably qualified candidates for appointment to the post of medical practitioner, Grade B at the above-mentioned institution with salary on the scale £720 × 40—£960 per annum.

In addition, a temporary cost-of-living allowance at rates prescribed from time to time by the Administrator, is payable. The present rates are £320 per annum for a married person and £100 per annum for a single person.

The appointment of the successful candidate will be in terms of and subject to the provisions of the Hospital Board Service Ordinance No. 19 of 1941 and the regulations framed thereunder.

Applications should be submitted (in duplicate) on the prescribed form Staff 23 which is obtainable from the Director of Hospital Services, P.O. Box 2060, 112 Loop Street, Cape Town, the Acting Branch Representative, Hospitals Department, P.O. Box 1487, 58 Loop Street, Cape Town, the Medical Superintendent of any Provincial Hospital or the Secretary of any School Board in the Cape Province.

Applications should be addressed to the Acting Branch Representative, Hospitals Department, P.O. Box 1487, 58 Loop Street, Cape Town, and should be posted to arrive not later than noon on 14 March 1953. (44007)

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

HONORARY APPOINTMENT: SETTLERS' HOSPITAL: GRAHAMSTOWN

Applications are invited from registered medical practitioners for the post of Honorary Visiting Orthopaedic Surgeon at Settlers' Hospital, Grahamstown. The successful applicant will be expected to hold a clinic at the hospital not more frequently than once a month.

Applications containing full particulars of age, qualifications, experience, etc., should reach the Medical Superintendent not later than Saturday, 28 March 1953.

Practice For Sale

Large and high-class general practice with small railway appointment carrying full free pass facilities. Annual turnover tops £5,000 with no bad debts. Practice is on tarred national road in heart of best sheep farming area in Free State. Most modern and well-equipped hospital facilities. This practice really needs a man capable of doing surgery, as no surgeon is available at present. This will add materially to the turnover. House of 10 rooms including attached surgery which can be taken over if so desired. Price and terms on application to 'A. P. P.', P.O. Box 643, Cape Town.

Medical Officer

The Tramway Employees' Sick Fund requires the services of a part-time medical officer with a consulting room in the area Bergvliet—Pollsmoor—Retreat. Applications to be in by Monday, 9 March 1953. Write 'Medical', P.O. Box 115, Cape Town.

This appointment has the approval of the Medical Association.

Room To Let

Doctor's consulting room to let. Opposite Moroka Native Township. Excellent position; unlimited scope. Reply to: Moroka Furnishers (Pty.) Limited, P.O. Box 28, Kliptown, Transvaal.

Practice for Sale

Dispensing practice not far from Cape Town, one appointment. Gross income £3,200. Goodwill, drugs, instruments, etc. £1,500. House with rooms attached for sale £4,000. Write 'A. O. X.', P.O. Box 643, Cape Town.

Partnership Wanted

Doctor, 4 years in practice, including 2½ years' hospital experience, is desirous of obtaining a partnership or assistantship with view in Cape Town or vicinity. Write 'A.P.K.', P.O. Box 643, Cape Town.

Transvaalse Provinsiale Administrasie

VAKATURES BY PUBLIEKE HOSPITALE

Aansoeke word ingewag van kandidate met geskikte kwalifikasies vir die onderstaande poste by Publieke Hospitale in die Transvaal.

Aansoeke moet gerig word aan die Geneeskundige Superintendent en Verantwoordelike Geneesheer van die betrokke hospitaal en moet volle besonderhede bevat aangaande die ouderdom, professionele, akademiese en taalkwalifikasies, ondervinding en huwelikstaat van die applikant en moet voorts 'n aanduiding bevat van die vroegste datum waarop diens aanvaar kan word:

Lewenskostetoelae tans betaalbaar aan voltydse werknemers:

Salaris	*Lewenskostetoelae*	
	Getroud	*Ongetroud*
Oor £350	£320 p.j.	£100 p.j.

Van persone wat aangestel word, sal verwag word om bevredigende sertifikate in te dien, asook om hulle te onderwerp aan 'n geneeskundige ondersoek by die betrokke hospitaal.

Aansoek vorms is verkrygbaar van enige Transvaalse Publieke Hospitaal of die Provinsiale Sekretaris, Afdeling Hospitaaldienste, Posbus 2060, Pretoria.

Benewens jaarlikse salaris en lewenskostetoelae ontvang voltydse werknemers spoorwegkonsessie en word verlof toegestaan ooreenkomstig die hospitaal verlofregulasies.

Die sluitingsdatum van aansoeke vir die poste is 9 Maart 1953.

Hospitaal	*Vakature*	*Emolumente*	*Opmerkings*
Boksburg-Benoni	Deeltydse Spesialis (Departement van Kindergeneeskunde) (1)	£615 p.j.	Geregistreerde mediese praktisyn. Moet behoorlik deur opleiding en ondervinding gekwalifiseerd wees. Drie sessies per week.
Duiwelskloof	Verantwoordelike Geneesheer (1)	£1,000 x 50 —1,200	Geregistreerde mediese praktisyn. Plus £180 per jaar huistoelae en £30 per jaar klimaatstoelae.
Potgietersrust	Verantwoordelike Geneesheer (1)	£1,000 x 50 —1,200	Geregistreerde mediese praktisyn. Plus £180 per jaar huistoelae.
Pretoria	Kliniese Assistent (Algemene Chirurgie) (1)	£620—780 —820— 860	Geregistreerde mediese praktisyn. Applikante moet bereid wees om op 1.1.54 dienste te aanvaar. Sluitingsdatum 31.3.53. Die pos word heradverteer. Was reeds in Mediese Tydperk van 7.2.53 geplaas.

(39784)

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

HOSPITAL BOARD SERVICE: VACANCIES

1. Applications are invited from registered medical practitioners for the following vacant posts in the Hospital Board Service:

Institution	*Post*	*Emoluments*	*Closing date*	*Applications must be addressed to:*
Kimberley Hospital, Kimberley.	Medical practitioner, Grade E (Radiologist)	£1,600 p.a. (fixed).	21.3.53.	The Director of Hospital Services, P.O. Box 2060, Cape Town.
Hottentots Holland Hospital, Somerset West.	Medical Superintendent (Part-time).	£540 p.a. (fixed)	21.3.53.	The Director of Hospital Services, P.O. Box 2060, Cape Town.
Rondebosch and Mowbray Hospital.	Medical Superintendent (Part-time).	£720 p.a. (fixed)	21.3.53.	The Director of Hospital Services, P.O. Box 2060, Cape Town.
Peninsula Maternity Hospital.	Medical Superintendent (Part-time).	£810 p.a. (fixed)	21.3.53.	The Director of Hospital Services, P.O. Box 2060, Cape Town.

2. Conditions of service are prescribed in terms of Hospital Board Service Ordinance No. 19 of 1941, as amended and the regulations framed thereunder.

3. In addition to the scale of salary indicated a cost-of-living allowance at rates prescribed from time to time by the Administrator is payable to whole-time officials and employees.

4. The successful candidates if not already in the Hospital Board Service will be required to submit satisfactory Birth and Health Certificates.

5. Applications must be made on the prescribed form (Staff 23) which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

6. Candidates must state the earliest date on which they can assume duty. (A562930)

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

HOSPITAL BOARD SERVICE: VACANCY

1. Applications are invited from registered medical practitioners for the following vacant post in the Hospital Board Service:—

Institution	*Post*	*Emoluments*	*Closing date*	*Applications must be addressed to:*
Sutherland Hospital, Sutherland	Medical Superintendent, (part-time)	£180 p.a. (fixed)	13 March 1953	The Director of Hospital Services, P.O. Box 2060, Cape Town.

2. Conditions of service are prescribed in terms of Hospital Board Service Ordinance No. 19 of 1941, and the regulations framed thereunder.

3. Application must be made on the prescribed form (Staff 23) which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

4. Candidates must state the earliest date on which they can assume duty. A562922

Provinsiale Administrasie van die Kaap die Goeie Hoop

HOSPITAALDEPARTEMENT

HOSPITAALRAADSDIENS: VAKATURES

1. Aansoeke word ingewag van geregistreerde geneeshere vir die volgende vakante poste in die Hospitaalraadsdiens:—

Inrigting	*Pos*	*Emolumente*	*Sluitingsdatum*	*Aansoeke moet gerig word aan:*
Kimberley-hospitaal, Kimberley.	Geneesheer, Graad E (Radioloog).	£1,600 p.j. (vasgestel)	21.3.53.	Die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad.
Hottentots Holland-hospitaal, Somerset-Wes.	Mediese Superintendent (Deeltyds).	£540 p.j. (vasgestel)	21.3.53.	Die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad.
Rondebosch en Mowbrayhospitaal.	Mediese Superintendent (Deeltyds).	£720 p.j. (vasgestel)	21.3.53.	Die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad.
Skiereilandse Kraamhospitaal.	Mediese Superintendent (Deeltyds).	£810 p.j. (vasgestel)	21.3.53.	Die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad.

2. Die diensvoorwaardes word voorgeskryf ingevolge die Ordonnansie op Hospitaalraadsdiens nr. 19 van 1941, soos gewysig, en die regulasies wat daarkragtens opgestel is.

3. Benewens die salarisskaal soos aangedui, is 'n lewenskostetoelae betaalbaar aan voltydse beamptes en werknemers teen bedrae wat van tyd tot tyd deur die Administrateur vasgestel word.

4. Die geslaagte kandidate, indien nie reeds in die Hospitaalraadsdiens nie, moet bevredigende Geboorte- en Gesondheidssertifikate indien.

5. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23) wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige Provinsiale Hospitaal of by die Sekretaris van enige Skoolraad in die Kaapprovinsie.

6. Kandidate moet die vroegste datum meld waarop hulle diens kan aanvaar. (A562930)

Provinsiale Administrasie van die Kaap die Goeie Hoop

HOSPITAALDEPARTEMENT

HOSPITAALRAADSDIENS: VAKATURE

1. Aansoek word ingewag van geregistreerde mediese praktisyne om die volgende vakante pos in die hospitaalraadsdiens:

Inrigting	*Pos*	*Emolumente*	*Sluitingsdatum*	*Aansoeke moet gerig word aan:*
Sutherland-hospitaal, Sutherland	Mediese Superintendent, (deeltyds)	£180 p.j. (vasgestel)	13 Maart 1953	Die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad.

2. Die diensvoorwaardes word voorgeskryf ingevolge die Ordonnansie op Hospitaalraadsdiens nr. 19 van 1941, en die regulasies wat daarkragtens opgestel is.

3. Aansoek moet gedoen word op die voorgeskrewe vorm (Staf 23) wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige provinsiale hospitaal of by die Sekretaris van enige Skoolraad in die Kaapprovinsie. A562922

Provincial Administration of the Cape of Good Hope / University of Cape Town:

JOINT MEDICAL STAFF FOR GROOTE SCHUUR AND OTHER TEACHING HOSPITALS: VACANCIES

(1) Applications are invited from registered medical practitioners (registered specialists) for appointment to the following posts:

Department of Pathology. Two posts of Medical Practitioner, Grade D (Third Assistant) with salary on the scale £1,200 × 50—£1,500 per annum.

(2) The conditions of service are prescribed in terms of the Hospital Board Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.

(3) The Joint Medical Staff will be required to serve jointly the Provincial Administration of the Cape of Good Hope and the University of Cape Town.

(4) Application must be made on the prescribed form (Staff 23) which is obtainable from the Director of Hospital Services, P.O. Box 2060, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

(5) The completed application forms must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, and must reach him not later than 9 March 1953. Candidates must state the earliest date on which they can assume duty.

A562921

Wankie Colliery Company Limited

Applications are invited from male medical practitioners for appointment as Assistant Medical Officer at the Company's Collieries at Wankie, Southern Rhodesia.

Applicants should have a sound general medical experience and either (a) considerable experience in major surgery or (b) similar experience in obstetrics and gynaecology. The Assistant Medical Officer will be required to attend both European and African populations.

The Assistant Medical Officer will be responsible to the Chief Medical Officer and will be a member of a staff of 4 medical officers.

Commencing salary not less than £1,400 per annum, depending upon qualifications and experience. A cost-of-living allowance will be paid which at the present time amounts to £20 2s. 2d. for a married man and £10 1s. 1d. for a single man, per month. The salary is inclusive of an allowance in lieu of private practice and no professional private practice fees will therefore accrue.

Free house, fuel, light, water and sanitary services.

In the case of a married man up to 3 personal servants, who may be engaged by the Medical Officer, will be rationed and housed free of charge by the Company.

The Assistant Medical Officer will be required to supply his own car which will be maintained and lubricated free of charge by the Company.

The Company will also make a petrol allowance.

Leave—Casual: 7 days per annum. Annual: 30 days after each year. Long: 90 days after every 5 years.

Pension Scheme.

Applications, stating age, qualifications, experience, and the names of 3 persons to whom reference can be made, should be forwarded to the Chief Medical Officer, Wankie Colliery Company Limited, Wankie, Southern Rhodesia, so as to be received not later than 14 March 1953.

Radiographer Required

Radiographer required for private radiological practice in Johannesburg. Salary according to experience. Reply to 'A. P. S.', P.O. Box 643, Cape Town.

Provinsiale Administrasie van die Kaap die Goeie Hoop/Universiteit van Kaapstad:

GESAMENTLIKE MEDIESE PERSONEEL VIR DIE GROOTE SCHUUR EN ANDER OPLEIDINGS-HOSPITALE: VAKATURES

(1) Aansoeke word ingewag van geregistreerde geneeshere (geregistreerde spesialiste) vir aanstelling tot die volgende poste:—

Departement van Patologie. Twee poste Geneesheer, Graad D (Derde Assistent) met salaris volgens die skaal £1,200 × 50—£1,500 per jaar.

(2) Die diensvoorwaardes word voorgeskryf ingevolge die Ordonnansie op Hospitaalraadsdiens nr. 19 van 1941, soos gewysig, en die regulasies wat daarkragtens opgestel is.

(3) Van die Gesamentlike Mediese Personeel sal vereis word om die Provinsiale Administrasie van die Kaap die Goeie Hoop en die Universiteit van Kaapstad gesamentlik te dien.

(4) Aansoek moet gedoen word op die voorgeskrewe vorm (staf 23) wat verkrygbaar is by die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, of by die Mediese Superintendent van enige provinsiale hospitaal of sekretaris van enige skoolraad in die Kaapprovinsie.

(5) Die ingevulde aansoekvorms moet gerig word aan die Direkteur van Hospitaaldienste, Posbus 2060, Kaapstad, en moet hom uiters op 9 Maart 1953 bereik. Kandidate moet die vroegste datum meld waarop hulle diens kan aanvaar.

A562921

Provincial Administration of the Cape of Good Hope

HOSPITALS DEPARTMENT

JOINT MEDICAL STAFF

1. Applications are invited for the under-mentioned vacant post of medical practitioner on the Joint Medical Staff of the Groote Schuur Hospital.

2. The conditions of Service are prescribed in terms of the Hospital Board Service Ordinance No. 19 of 1941, as amended, and the regulations framed thereunder.

3. Applications should be submitted (in duplicate) on the prescribed form Staff 23, which is obtainable from the Director of Hospital Services, P.O. Box 2060, Provincial Building, Wale Street, Cape Town, or from the Medical Superintendent of any Provincial Hospital or Secretary of any School Board in the Cape Province.

4. The closing date for the receipt of applications is 14 *March*, 1953 and applications should be addressed to the Medical Superintendent, Groote Schuur Hospital, Observatory, Cape.

5. The successful applicant will be required to assume duty on 1 April, 1953.

6. The successful applicant shall be available for circulation among the different Departments at the discretion of the Medical Superintendent, acting on the recommendation of the Medical Executive and Advisory Committee.

Department	*Post*	*Salary*
Orthopaedic	Medical Practitioner Grade C	£1,000 × 50—1,200 p.a.

In addition a cost-of-living allowance is payable at present at the rate of £320 p.a. to married officials and £100 to single officials.

Qualifications

Not less than five years' experience after graduation or four years' experience after registration, of which not less than three years shall have been spent in training as a specialist in the specialities included in the department in which the vacancy occurs.

(A12037

Printed by Cape Times Ltd., Parow, and Published by the Proprietors, THE MEDICAL ASSOCIATION OF SOUTH AFRICA, MEDICAL HOUSE, 35 Wale Street, Cape Town. P.O. Box 643. Telephone 2-6177. Telegrams: 'Medical'